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AN ANALYSIS OF THE RELATIONSHIP AMONG ABILITY MEASURES, EDUCATION AND EARNINGS

by

Susan Jennifer Hill

December 1987

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An Analysis of the Relationship Among Ability Measures, Education and Earnings

by

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Lieutenant, United States Navy
B.A., University of Michigan, 1983

Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

This thesis analyzes the interrelationship of measures of ability and education on earnings differentials by using a standard human capital earnings function. The data used are from the 1983 and 1984 panels of the National Longitudinal Survey of Youth aged 14 to 21 in 1979. The Armed Forces Qualifying Test (AFQT) and Coding Speed (a subtest of the Armed Services Vocational Aptitude Battery (ASVAB) Form 8A) were examined and compared for their relative utilities in measuring ability. The results showed that both AFQT and Coding Speed performed as measures of ability by refining the estimated returns to education. Their relative utilities varied according to an individuals occupation and level of education.

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I. INTRODUCTION

A. PROBLEM AND BACKGROUND

Estimates of the economic effects of education on individual income have long been the focus of economic interest. Recent studies have examined this issue by estimating a standard human capital earnings function and deriving estimates of the rates of return to educational attainment. Standard human capital earnings functions relate educational attainment and work experience (a proxy for on the job training) to earnings. These studies have become more robust and complex by including in the human capital model such factors as periods of unemployment, region, gender, race and marital status.

Many of these studies, however, have failed to include a measure of innate ability. Ability is an important determinant of earnings for several reasons. For a given level of education, it is assumed that individuals with greater ability will acquire skills more quickly, thereby becoming more productive and receiving higher wages than their counterparts with less innate ability. Additionally, individuals with higher ability tend to acquire more education. Hence, most studies of returns to education have included returns to ability in their estimated returns to education when a measure of ability is not included in the estimating equation. Finally, the estimated returns to education will be biased further upward if we accept the notion that ability has a positive effect on earnings which is independent of its effect on the amount of education acquired (Griliches, 1977, p.4). Therefore, in order to obtain an unbiased estimate of the rate of return to education, a valid ability measure must be included in the human capital earnings function.

This issue is an important one for the U.S. military. In order for the military to meet its manpower needs in this time of increasing demand and declining resources, it is essential that they effectively differentiate between individuals who are trainable and those who are not. A valid measure of ability would be invaluable in this process. It is also possible that substantially higher civilian earnings are available to individuals with greater ability, giving them a stronger incentive to leave the military. If retention of these individuals is particularly desirable, a measure of ability would be helpful in determining who qualifies for ability-related retention incentives.

Estimating the contribution of innate ability is hampered both by a lack of consensus on valid ability measures and by few data bases which contain good candidates for measures of ability. The National Longitudinal Survey (NLS) of Youth contains extensive data on earnings, employment, education and other human capital and environmental factors. It also includes test scores from the Armed Services Vocational Aptitude Battery (ASVAB) Form 8A, which was administered to the sample in 1979 and 1980. This ASVAB contains ten subtests used by the military services to determine enlistment eligibility and placement of recruits. With such a wide range of variables, the NLS-Youth data base is extremely useful for studying the effect of ability on earnings.

The intent of this thesis is to test various composites of the ASVAB for their usefulness as measures of ability, and, to use them to analyze the interrelationship of ability and education on earnings. Ideally, ability should be measured prior to, or independently of, any educational attainment. The ASVAB subtest scores necessarily reflect, to some degree, an individual's acquired education as well as his/her innate ability. Since the age window of NLS respondents in 1984 was 18 to 27, this analysis will consider early labor force earnings only. It is hypothesized that the inclusion of a valid ability measure in a standard human capital earnings function will both yield an estimate of the effect of ability on earnings and reduce the bias in the estimate of the effect of education on earnings.

B. LITERATURE REVIEW

Several previous studies have examined the relative effects of ability and education on earnings. Numerous other studies have not included ability measures but have provided insight into the effects on earnings of other human capital, environmental or personal characteristics.

1. Ashenfelter and Mooney (1968)

Ashenfelter and Mooney conducted a study to determine: (a) what sort of ability index is relevant for highly educated individuals, (b) how quantitatively important is an ability index, and (c) how do estimates of education-related variables change when an ability measure is included. (Ashenfelter and Mooney, 1968, p.78)

Their data consisted of a cohort of male graduate students in the arts and sciences who had received Woodrow Wilson fellowships between 1958 and 1960. Thus their sample was fairly homogeneous, consisting of men of approximately the same age, all well-educated, and all recent entrants to the labor force (Ashenfelter and Mooney, 1968, p.79).

Their human capital model used annual salary as the dependent variable. Measures of ability were the mathematical aptitude, verbal aptitude and average of math and verbal aptitudes from the Scholastic Aptitude Test (SAT), as well as whether or not the individual had been a Phi Beta Kappa as an undergraduate. Other variables included were Field of Graduate Study (Humanities, Social Science or

Natural Science), number of years of graduate education, highest degree held (B.A., Masters, Ph.D. or other), and number of years working.

Of the ability measures, only mathematics aptitude was significant. When included in the equation, it had a coefficient of 2.1, significant at the 0.05 level. Using a linear functional form, this implies a two dollar increase in annual income for every additional test point. When separate equations were estimated for the Humanities and Social Science fields, the coefficients were 1.3 and 4.3, respectively, and were significant at the 0.01 level. (Ashenfelter and Mooney, 1968, p.83)

With regard to the three questions they aimed to address, they concluded that (a) an index of mathematical ability is relevant for studying the earnings of highly educated individuals, (b) an additional test point provides an additional two dollars of annual income, and (3) inclusion of an ability measure changes estimates of education-related variables very little. (Ashenfelter and Mooney, 1968, p.86)

2. Griliches and Mason (1972)

Griliches and Mason analyzed a sample of 1,454 male post-World War II military veterans who were 16-34 years old in 1964. Inclusion in the study required that they be employed full time, not enrolled in school, and have an Armed Forces Qualifying Test (AFQT) score available. This sample was truncated on both ends of the range of ability, since those on either end were less likely to have served in the military than those in the middle. (Griliches and Mason, 1972, p.77)

The natural logarithm of gross weekly earnings was used as the dependent variable, and the AFQT percentile score (measured prior to military service) was the measure of ability. Additional explanatory variables included age, race, the amount of prior military service, and various family, personal background and location variables.

Education was measured both prior to entering the service and at the time of the survey, with the difference acting as a "schooling increment." This schooling increment was therefore a measure of that schooling which occured after ability was measured, so that the measured ability was not a result of this schooling. Only a very small correlation was found between AFQT and the schooling increment. (Griliches and Mason, 1972, p.79) It is possible, however, that the size of the schooling increment was partially determined by the individual's ability. Since those with higher ability tend to acquire more education, they may have had more education prior to being tested, and/or would tend to acquire more education after being tested.

When ability and background measures were absent from the equation, the return to the schooling increment was 5.3 percent, significant at the 0.01 level. Adding AFQT and the background variables to the equation caused this rate of return to drop to 4.6 percent, a reduction of 12 percent, while remaining significant. The return to AFQT never exceeded 0.25 percent, but was also significant at the 0.01 level. (Griliches and Mason, 1972, p.86)

The authors concluded that estimated returns to education may be upwardly biased when an ability measure is omitted, but that this bias is not large. The net contribution of ability to explaining variations in earnings was very small, increasing R^2 by an amount from 0.003 to 0.022. The largest R^2 attained was 0.298, with all variables included in the equation. (Griliches and Mason, 1972, p.88)

3. Hause (1972)

Hause studied four different cohort samples using the same general method to examine the relationship between ability, education and earnings. He stated the caveat that these sample populations are more homogeneous than the population as a whole, particularly when broken down by education class. This causes the coefficients of determination to be relatively small and some of the standard errors for the ability coefficients to be large. This caveat should be kept in mind when examining his results. (Hause, 1972, p. 113)

Hause's first hypothesis was that the relative effect of ability on earnings increases with the level of schooling (Hause, 1972, p.111). To test this hypothesis, all data were pooled (except for medical doctors) and a regression was run using earnings, the ability measure, years of education, an interaction term (ability times years of education) and the background variables.

Hause's second hypothesis was that, for a given level of education, the effect of ability on earnings should not decrease over time. Within-schooling-class regressions were calculated of the log of earnings from a given year on the log of earnings from an earlier year. The residuals were then regressed on the ability measure, again within schooling class. The purpose of this two-stage least squares method was to discover whether earnings in the earlier year captured most of the effect of ability, so that ability would then have a negligible effect on the later year's earnings. (Hause, 1972, p. 116)

One sample used was the National Bureau of Economic Research (NBER) - Thorndike sample, consisting of 2300 white males who passed a battery of tests given to potential pilots and navigators in 1943 (Hause, 1972, p. 113). This sample was prescreened before taking the ability tests, in that men who desire to be pilots/navigators are probably non-representative of the population. Earnings data were collected in 1955 and 1969. Hause looked at only those men born between 1921 and 1925. He stated that this created a sample such that most men had completed high school but had little or no additional education when they took the ability tests. However, those born in 1921 would have been 22 years old in 1943. Since this is the age at which most individuals who planned to go to college would be receiving their degrees, in contrast to the author's statement, it would seem that the sample tested included men with some college education, even college degrees, as well as men with no more than high school education.

As background variables, Hause used father's education, religion, marital status and region (a dummy for Southeast). The regression also included 1969 earnings, the ability measure, years of education, and the interaction term. As stated above, the data were pooled to test the first hypothesis.Using a linear functional form, the interaction term was positive and significant at the 0.02 level, supporting the first hypothesis. When the regression was run using the natural logarithm of 1969 earnings, no coefficients were significant. (Hause, 1972, p.115)

To test the second hypothesis, within-schooling-class regressions were calculated of the log of 1969 earnings on the log of 1955 earnings. The residuals were then regressed on the ability measure, again within schooling class. All of the ability coefficients were positive when the residuals were regressed on the ability measure, indicating that ability played an increasing role in determining earnings over time. (Hause, 1972, p. 116)

The Rogers sample consisted of 343 white males who were in 8th grade in 1935 when they were tested for IQ. The specific IQ test given was not indicated. The background variables used were family socioeconomic status, religion, marital status, and a dummy variable indicating whether the individual had attended a private school prior to college.

Using both 1965 earnings and the natural logarithm of 1965 earnings, the interaction term was again positive. However, the small sample size did not allow Hause to attach any statistical significance to this result. Two-stage least squares was again used to test the effect of ability over time. The IQ coefficients were positive, indicating an increasing effect of ability over time. (Hause, 1972, p. 120)

The Project Talent sample provided the opportunity to study early lifetime earnings and several different types of ability measures. The sample consisted of 8,840 white males who were employed full time in 1966 and were high school juniors in 1959 when they took the Project Talent battery of ability and achievement tests. Ability measures from these tests included a composite score correlated with IQ, a composite quantitative score, an arithmetic computation score and a clerical checking score. (Hause, 1972, p. 123) Background variables included socioeconomic status, religion, non-public school attendance, region and the natural logarithm of weeks worked in the past year.

Hause used the natural logarithm of 1962 and 1965 earnings to perform the two-stage least squared regressions. The 1962 coefficients for the composite and quantitative scores were both negative and significant at the 0.05 level for high school graduates only one year out of school. However, by 1966 none of the ability coefficients were significantly negative, for any level of schooling. The statistically significant coefficients from 1966 were: for high school graduates, the quantitative and clerical measures; for all college nongraduates, the clerical; and for later college nongraduates, the arithmetic measures. Hause concluded that more specific ability measures, such as arithmetic computation and clerical checking, have a larger effect on earnings than do general cognitive measures, such as IQ and composite quantitative scores, early in lifetime earnings. (Hause, 1972, p. 126)

The Husen sample consisted of 450 Swedish males who were in third grade in 1938 when they took four unidentified subtests similar in content to IQ tests. The sum of these four scores made up the ability measure. Some members of the sample also had IQ test scores available from 1948.

Background variables included social class, marital status, and whether the individual had suffered a serious prolonged illness during or after his late teens.

Only the second hypothesis was tested with this sample: that the relative effect of ability on earnings increases with the level of schooling. The results generally supported it, taking into account differences in the educational system. When IQ was used, the results showed at least a 10 percent earnings differential for those passing the realexamen (secondary school) or studentexamen (approximately junior college). This is similar to the results for college graduates from the Rogers sample, and larger than the results for the NBER-Thorndike sample. (Hause, 1972, p. 130)

To summarize Hause's results, he stated: For low levels of schooling (less than high school graduate in the U.S. data), ability differentials are of negligible importance in creating earnings differentials. For high levels of schooling, one standard deviation of within-sample-schooling-class measured ability is associated with earnings differentials ranging from 10 to 13 percent by the time males are 35-40 years old. (Hause, 1972, p. 131)

4. Taubman and Wales (1974)

Taubman and Wales also analyzed the NBER-Thorndike sample, previously described in the section on Hause's study. They used as ability measures four orthogonal factors extracted from the ability tests using factor analysis. These factors measured spatial perception, physical coordination, mathematical ability and verbal ability (Taubman and Wales, 1973, p. 32).

Two ordinary least squares linear equations were estimated, one for 1955 earnings and one for 1969 earnings. The equations included level of education, personal biography (a variable constructed by Thorndike and Hagen from data on hobbies, family income, education prior to 1943 and mathematical ability), health, marital status, father's education, age and a dummy variable for pre-college teachers. There were seven educational groups: (1) some college, (2) undergraduate degree, (3) some graduate school, (4) master's degree, (5) Ph.D., (6) M.D., and (7) L.L.B. (Taubman and Wales, 1973, p. 33)

The authors found that only the inclusion of mathematical ability caused a significant reduction in the size of the estimated education coefficients. The increment in annual earnings from an undergraduate degree for the average high school graduate were 12 percent in 1955 and 31 percent in 1969 (Taubman and Wales, 1973, p. 33). Results also showed that ability had little effect on initial earnings, but that the effect grew over time (Taubman and Wales, 1973, p. 35). When the earnings function was estimated by occupation, none of the ability measures were significant in blue-collar occupations, and only mathematical ability was significant in the managerial, professional, technical and sales occupations (Taubman and Wales, 1974, p. 8).

Taubman and Wales also studied Wolfle and Smith's data on Minnesota high school graduates in 1938. Earnings were measured in 1953, and IQ served as the ability measure. The specific form of IQ test was not identified. IQ scores were divided into tenths and represented by dummy variables. The data were grouped into two occupational categories: (1) the three highest paying occupations (professional, semi-professional-managerial and sales), and (2) the five lowest paying occupations (clerical, service, skilled, farm and unskilled). There were only 30 observations in the first group and 50 in the second group. The five educational groups were: (1) attended vocational, military, or other non-college school, (2) attended college for less than two years, (3) attended college for at least two years, but had no degree, (4) undergraduate degree, and (5) more than one degree.

Using binary variables to represent the educational groups and IQ scores, separate equations were estimated for each occupational category. The authors found that ability had a large and significant effect on earnings for the high-paying occupational group, but not for the lower-paying group (Taubman and Wales, 1974, p. 53). Taubman and Wales also tried "rank in class" as an ability measure, but found that the ability coefficients were much smaller and were no longer significant (Taubman and Wales, 1974, p. 51).

5. Boissiere, Knight and Sabot (1985)

The authors surveyed 205 individuals in Kenya and 179 in Tanzania in 1980 to study the effects of human capital factors on earnings differentials. A random sample of primary and secondary school completers were given tests for literacy and numeracy which were developed for this study by the Educational Testing Service at Princeton University. The sum of an individual's scores on these two tests formed the measure of cognitive achievement. Reasoning ability was measured using Raven's Progressive Matrices.

Interestingly, the authors addressed the issue that the ability measure may also reflect education. They noted that the mean values of reasoning ability were not significantly different for the two countries, while the mean values of cognitive achievement were significantly different, due to the higher quantity and quality of secondary education in Kenya. They concluded from this that reasoning ability was not acquired in school. (Boissiere, et al, 1985, p. 1020)

Boissiere, Knight and Sabot used the natural logarithm of gross earnings as the dependent variable. Explanatory variables included a dummy variable indicating completion of secondary school as opposed to primary school only, experience, and experience squared. The model was estimated for each country separately.

Returns to secondary education declined by two-thirds when reasoning ability was included in the model. This caused the effect of education in Tanzania to become insignificant. However, the returns to reasoning ability were small and insignificant for both countries. Returns to cognitive achievement were positive, significant and relatively large. (Boissiere, et al, 1985, p. 1020)

The authors also estimated separate equations for manual workers, white collar workers, primary leavers and secondary leavers. The coefficient of reasoning ability was never large or significant. However, cognitive achievement was relatively large and significant for all groups, except for manual workers and primary leavers in Tanzania. (Boissiere, et al, 1985, p. 1020)

The authors concluded that, for Kenya and Tanzania, direct returns to reasoning ability were small, direct returns to education were moderate, and direct returns to literacy and numeracy were large and not significantly lower for manual workers vice white collar workers. (Boissiere, et al, 1985, p. 1029)

6. Knowles (1986)

Knowles examined the 1984 increment of the NLS-Youth data base to compare the effects of two measures of ability: percentile score on the AFQT and standardized score on the Coding Speed subtest of the ASVAB. His sample consisted of 3,608 full-time employed civilian workers who were between the ages of 14 and 21 in 1979.

The dependent variable was the natural logarithm of salary and wages in 1983. Independent variables included measures of education, education squared, experience, experience squared, gender, race, marital status, number of dependents, region, whether the respondent lived on a farm, and months spent out of the labor force or unemployed.

The regression equation was first estimated using the entire sample and omitting both ability measures. The equation was then re-estimated including each of the ability measures. The inclusion of AFQT caused the rate of return to education to drop by 40 percent, from 8.8 percent to 5.3 percent. Use of Coding Speed caused a decline of nearly 13 percent, to 7.7 percent. (Knowles, 1986, p. 41)

The above analysis was then carried out for two educational subsets and five occupational subsets. The educational subsets were: (1) high school graduates and below, and (2) college attendees with greater than 25 semester hours. The occupational subgroups were: (1) managerial and professional, (2) sales, (3) service, (4) technical, and (5) clerical and administrative.

For both educational subgroups, the bias on the education coefficients was substantial when ability was omitted. For college attendees, inclusion of AFQT reduced returns to education by 73 percent, to 11.5 percent. Bias was smaller for the lower education subgroup, with AFQT causing a 34 percent reduction (from 11.1 percent to 7.3 percent) and Coding Speed causing a 23 percent decline (to 8.5 percent). (Knowles, 1986, p. 43)

Results for the occupational subgroups were similar. Inclusion of AFQT produced larger reductions in returns to education than did inclusion of Coding Speed, indicating that AFQT has greater utility as an ability proxy (Knowles, 1986, p. 43). The highest returns to education (with AFQT in the equation) were found to be for technical occupations at 8.1 percent and clerical-administrative occupations at 7.8 percent. The remaining three occupational categories showed returns to education below 4 percent. The coefficients on

AFQT were significant at at least the 0.01 level for all occupational subgroups, but never exceeded a value of 0.005. (Knowles, 1986, pp. 44-47)

Knowles then stratified the sample into four educational subgroups: (1) non-high school graduates, (2) high school graduates with less than 2 years of college, (3) greater than 2 years of college but less than a 4 year degree, and (4) a four year degree or higher. The intent was to examine more closely the relative utility of the ability proxies by making the sample more homogeneous (Knowles, 1986, p. 50). In three of the four cases, AFQT acted as a more effective ability measure. Only for the second educational subgroup did both proxies prove to be equally useful. (Knowles, 1986, pp. 52-53)

The coefficients on AFQT were significant at the 0.001 level in all subgroups, except for education class 1, where it was insignificant. However, all values were small, not exceeding 0.005. (Knowles, 1986, pp. 48-49)

The final phase of Knowles' study involved estimating the model for each occupational group within the four educational strata. The purpose was to compare the utility of the ability proxies for different occupations at various level of schooling (Knowles, 1986, p. 34). This analysis was limited to the four subsamples which contained at least one hundred observations: for high school graduates with less than 2 years of college, clerical-administrative, sales, and service occupations; for those with at least a four year degree, the managerial-professional occupations. (Knowles, 1986, p.57)

For the three occupations containing individuals with a high school degree and less than 2 years of college, AFQT provided slightly greater utility as an ability measure than did Coding Speed. The explanatory power of equations including AFQT was 0 to 2 percent higher than for equations containing Coding Speed. For those with at least a four year degree, in the managerial-professional occupations, AFQT was much more effective than Coding Speed. The difference in explanatory power for the two proxies was 10 percent. The regression coefficients for AFQT were all significant at at least the 0.01 level, but never exceeded 0.007 in value. (Knowles, 1986, pp.54-58)

Knowles concluded that "the inclusion of an ability measure in human capital earnings functions can substantially reduce the estimates of the returns from education." (Knowles, 1986, p.59) He also noted that his ability effects were considerably more significant than those found in the Griliches and Mason study. His conclusion was that differences in ability may explain more earnings differences for the new labor force participants of this study than for the more mature workers of the Griliches and Mason study (Knowles, 1986, p.59). This conclusion contradicts Taubman and Wales' findings that the effect of ability increases over time, and Hause's findings that the effect of ability does not decrease over time. (Taubman and Wales, 1974, and Hause, 1972)

C. SUMMARY

In summary, a vast amount of research in recent years has been directed toward explaining individual earnings differentials. A wide range of very different factors have been shown to have a significant effect on earnings. However, there is a severe lack of data bases which include all, or even most, of these variables. Such a data base would have to be huge in order to accomodate so many variables in a regression equation as well.

The results of earnings studies have provided varying conclusions. Ability has been shown to be insignificant (Boissiere, et al, 1985; Griliches and Mason, 1972). It has also been found to be significant (Knowles, 1986). Some studies have shown that mathematical ability is the only significant ability measure (Ashenfelter and Mooney, 1968), and perhaps only for white collar workers (Taubman and Wales, 1974). It appears that the effect of ability does increase over time (Taubman and Wales, 1974; Hause, 1972), and with the level of education (Hause, 1972). Most studies have shown that inclusion of an ability measure in an earnings equation does cause the estimated returns to education to decrease. It also appears that the magnitude and significance of the effects of ability on earnings vary with educational level and occupation.

Additional studies, while neglecting the effect of ability, have provided insight into other factors which have been shown to dramatically affect earnings. Behrman and Birdsall demonstrated the importance of including a measure of schooling quality as well as quantity (Behrman and Birdsall, 1985). Unfortunately, such measures are very difficult to find. The level of economic development in the area being studied also affects returns to education (Heckman and Hotz, 1986), as well as race and marital status (Blackaby, 1986; Nakosteen and Zimmer, 1986). Hartog has demonstrated significant effects from job level (Hartog, 1986), although it is possible that job level is a direct result of ability and time spent with a given employer.

Ideally, a measure of pre-school ability would be used in estimating earnings equations. This would be a much purer measure than one obtained after formal education has been permitted to contaminate it. The lack of such ability measures is the primary obstacle to achieving truly conclusive results.

Chapter II of this thesis will describe the data base and methodology used in this analysis. It will also provide the model specification and descriptions of the variables used. Chapter III will contain descriptive statistics for the subsample selected, as well as the results of the analysis. The final chapter will consist of conclusions from the analysis and recommendations for further study.

II. DATA AND METHODOLOGY

A. DATA

The National Longitudinal Survey of Youth is the data base used for this thesis. Four of the NLS studies originated in 1965 when the Center for Human Resource Research of The Ohio State University received a contract from the U.S. Department of Labor to conduct longitudinal studies of the labor market experience of selected segments of the population. The four cohort studies initiated in 1965 were men 45 to 59 years old, women 30 to 44 years old, and young men and women 14 to 24 years old. The purpose of these studies was to analyze the factors causing variations in the labor market behavior and experience of these groups. Therefore, the data collected related to variables that are believed to either influence or represent aspects of labor market activity and labor market status. (NLS Handbook, 1983, p.15)

In 1977 a decision was made to begin a new longitudinal study of young men and women. This study was to allow for replication of analyses made of the earlier youth cohorts, and to help evaluate new youth employment/training programs created by the 1977 amendments to the Comprehensive Employment and Training Act. This new panel of youth consisted of 5,700 young women and 5,700 young men between the ages of 14 and 21 in 1979. Blacks, Hispanics and economically disadvantaged whites were overrepresented. In addition, 1,300 individuals serving in the armed forces were included in the survey under funding by the Department of Defense and the services. (NLS Handbook, 1983, p.2)

In 1979 and 1980, the military decided to establish new test norms for the Armed Forces Qualifying Test, in order to reflect the current population of American youth. To accomplish this task, all respondents to the 1979 NLS-Youth survey were given the ASVAB Form 8A. Form 8A consisted of ten component subtests: (1) General Science, (2) Auto and Shop Information, (3) Arithmetic Reasoning, (4) Math Knowledge, (5) Word Knowledge, (6) Paragraph Comprehension, (7) Coding Speed, (8) Numerical Operations, (9) Electronics Information, and (10) Mechanical Comprehension. Appendix A contains a description of each of these subtests. These particular tests are included in the ASVAB because research and past experience have demonstrated that they are valid predictors of success in various types of military job training (Department of Defense, 1982, p.4). The presence of these test scores makes the NLS-Youth data set unique in its inclusion of potential ability measures along with extensive employment data.

The military services use a variety of composites from the ASVAB for selection and placement purposes. All of the raw test scores are converted into standardized scores using conversion tables. (The conversion tables for ASVAB Form 8A are provided in Appendix B. These tables also apply to Forms 9, 10A, 10B, 13C and 14.) The standardized scores are then used to determine eligibility for enlistment and/or a particular occupation or special program. Each service uses these standardized scores differently in the assignment process. In some cases each service uses a different composite score to determine eligibility for the same occupation.

This data set provides a unique opportunity to study the effects of ability, education and other human capital factors on earnings. It also provides ability measures in use by the military today, making the results of this study of particular usefulness to the armed forces.

B. METHODOLOGY

1. Sample Reduction

As stated in Chapter I, the purpose of this study is to test various composites of the ASVAB for their usefulness as measures of ability, and to use them in analyzing the interrelationship of ability and education on earnings. In order to accomplish this purpose, the NLS-Youth sample was reduced to include only those respondents who were full time workers and not in the military in 1983. Individuals in the military were excluded because their wages are not determined by the labor market in the same way that civilian wages are determined. The requirement for full time work was made to exclude individuals whose labor force commitment may be different from that of full time workers.

For the purpose of this study, full time workers are those who worked at least 36 weeks in 1983 and normally worked at least 35 hours per week. Respondents were also included if they worked between 30 and 34 hours per week and said that this constituted full time status in their job. The cutoff value of 36 weeks was selected to include individuals who were employed full time, but worked only part of the year. For example, full time employed teachers normally work for only 9 months (36 weeks) per year.

Another selection criterion required that the respondent not be self-employed. This requirement was made to help ensure that income was derived through labor market participation and the wage rate was set by the market, and to exclude the profits the self-employed may accrue.

After applying the above constraints, some spurious responses still existed. To eliminate spurious income observations, a minimum annual income of $4,221 was established. This figure was determined by multiplying the minimum wage in 1983 ($3.35) by a typical 35 hour work week for the minimum 36 weeks.

Outlier responses also existed for the level of education, where 1 percent of the respondents reported having completed less than the 8th grade. While these responses are not impossible, they are not reflective of the general population of 17 to 26 year olds. A minimum level of education was set at 8th grade to eliminate these observations and to permit consideration of earnings only for those with at least an elementary level of education. The final sample size was 4,072.

2. Formulation of the Regression Equation

The functional form of the standard human capital earnings equation will be used for this study. It can be expressed as:

$$\ln Y = a + b_i X_i + e_i$$

where Y is annual income, X_i is a vector of the quantities of the explanatory variables, a is a parameter to be estimated, b_i is a vector of parameters to be estimated, and e_i is a random disturbance term, assumed to be normally distributed.

a. The Dependent Variable

Using the standard human capital earnings formulation, the natural logarithm of annual salary and wages in 1983 is used as the dependent variable (Mincer, 1974, p. 130).

b. The Explanatory Variables

The explanatory variables to be used in this study were chosen from those human capital factors well established in the literature as explaining earnings differentials. The factors chosen measure education, work experience, race, gender, marital status, number of dependents, area of residence, and degree of labor force participation.

Two proxies for ability are studied. First, AFQT is examined for its usefulness as an ability measure. These results can be compared with the Griliches and Mason study which found that AFQT had limited utility as an ability measure (Griliches and Mason, 1972). The standardized score on the Coding Speed subtest of the ASVAB is also examined and compared to AFQT for its utility in measuring ability. Unlike the other ASVAB subtests, Coding Speed is not designed to measure knowledge in any particular subject. Rather, it is designed to test an individual's memory, hand-eye coordination and working speed (Steinberg, 1982, p. 17). The test provides a list of words at the top of the page with a four-digit number associated with each. The respondent is given one of those words and asked to choose the corresponding four-digit number from five choices. Only seven minutes are allowed to complete the 84 items in this subtest.

It is apparent that neither AFQT nor Coding Speed can be thought of as a measure of "pure, innate ability." Since the respondents in this sample have all completed at least the eighth grade, the attainment of education has certainly enhanced the respondents' scores on these tests. The simple correlation between Coding Speed and education for the aggregate sample is 0.4018, while the correlation between AFQT and education is 0.5606. The AFQT consists of scores obtained on subtests designed specifically to measure knowledge acquired in school. While the Coding Speed subtest is not designed to measure knowledge, it seems certain that individuals with more experience in memorizing and working quickly would score better on this test. These skills are "practiced" throughout the education process as students complete homework assignments and take exams.

Studies have shown, however, that there is some human quality which causes different individuals with the same amount of education to earn more in the market place, even after controlling for individual characteristics such as gender, region and race. This same quality appears to cause these individuals to acquire more education than their counterparts with similar personal characteristics. Perhaps, then, this concept of "ability" is not only a measure of intelligence and education, but also of "energy level" or "motivation to succeed." (Griliches, 1977, p. 7) Family background characteristics are probably also included in this measure. Regardless of its precise definition, the absence of such a measure from the regression equation has been shown to cause the coefficient of education to include this effect and be biased upward (Boissiere, Knight and Sabot, 1985, p.1016).

3. Conduct of the Analysis

In order to compare the utility of AFQT and Coding Speed, they must be examined for their usefulness in estimating earnings. To accomplish this, the rate of return to education is first estimated without either prospective ability measure in the regression equation. The equation is then estimated with one of the prospective ability measures included. A resultant change in the estimated returns to education indicates that the ability measure is indeed useful in refining the estimate of returns to schooling. The ability measure which produces the larger change and has the larger beta (standardized) coefficient has more utility as an ability measure (i.e is more useful in refining the estimated return to education). A significant coefficient for AFQT or CODING implies that the ability measure is essential to any effort to account for variation in earnings within that subgroup. An increase in the adjusted R^2 of the equation when an ability measure is added indicates that the ability measure contributes to explaining the variance in earnings, when degrees of freedom are accounted for. In other words, the ability measure belongs in the equation, and its exclusion will produce bias due to an omitted variable (Studenmund and Cassidy, 1987, p. 129). The model with the highest R^2 is most useful in explaining earnings differentials for that subset. This procedure is conducted first using AFQT as the ability measure, then using Coding

Speed in place of AFQT. Comparisons can then be made between the two proxies by comparing beta coefficients.

In the first phase of this analysis, the above procedure is followed using the aggregate sample, then using two subsets of the aggregate sample differentiated by gender. This phase permits a comparison of AFQT and Coding Speed over subsets containing respondents at all levels of educational attainment, and allows us to see if different factors contribute to earnings differentials for males and females.

In the second phase of the analysis, the above process is performed using subsets of each gender within each education group, then each occupation within each education group. This allows the utility of AFQT and Coding Speed to be compared among subsets which are more homogeneous. Grouping the data by level of education permits examination of earnings differentials with education held relatively constant, helping to explain earnings differentials among individuals with approximately the same level of education. Since the educational groups used are those traditionally rewarded monetarily in the work force, this method also permits us to examine whether or not there are returns to those years of education which do not result in a diploma, such as the tenth grade or the first year of college. The "occupation within education" estimations will be limited due to decreasing sample sizes.

It is important that a variety of subsets be examined, since there is no reason to assume that ability has the same effect on different groups or that the size of the ability bias is the same for different subgroups. In fact, the results available in the literature and discussed in Chapter I suggest that ability can be expected to have a different effect on different groups.

It is hypothesized that both AFQT and Coding Speed will cause the coefficient of education to change when one of them is included in the equation, regardless of the subset used. In most cases this effect is expected to be greater for AFQT, since it correlates more highly with years of schooling than Coding Speed does. However, Coding Speed is expected to cause a larger change in estimated returns to education within the operator and production occupations, since years of formal schooling tend to be of less importance in such tasks. As shown in previous studies, the effects of both ability measures are expected to increase with the level of education.

The four educational subsets to be studied are (1) less than a high school degree, (2) high school graduates, (3) some college, but not a four year degree, and (4) a four year degree or higher.

The seven occupational subsets to be studies are (1) managerial and professional, (2) technical, (3) sales, (4) clerical and administrative, (5) service, (6) production, and (7) operator occupations.

C. SELECTION OF THE VARIABLES

All variables used in the regression equations are contained in, or derived from variables contained in the NLS-Youth 1983 or 1984 samples. The definition of each variable is given in Table I.

An interaction term is included in this analysis to reflect the belief that certain explanatory variables do not affect the dependent variable independently of each other. In other words, a variable representing years of education X ability (INTER1) is used to test the belief that the effect of ability on earnings depends to some degree on the individual's level of education, and vice versa. (Pindyck and Rubinfeld, 1981, p. 110, and Neter, Wasserman, and Kutner, 1985, pp. 335-343)

TABLE I

DESCRIPTION OF VARIABLES

INC83:	Wages and salary of the respondent in 1983.
LINC83:	Natural logarithm of INC83.
AGE:	Age of the respondent on the survey date in 1983.
RACE:	Two dichotomous variables indicating whether or not the respondent is black, white, or a non-black minority. BLACK=1 if the respondent is black; BLACK=0 otherwise. OTHER=1 if the respondent is a non-black minority; 0 otherwise.
GENDER:	A dichotomous variable with a value of 1 for males and 0 for females.
MARSTA:	A set of three dichotomous variables respresenting combinations of marital status and whether or not the individual has dependents other than the spouse. SDEPS=1 if the respondent is single with dependents; 0 otherwise. MNONE=1 if the respondent is married with no dependents; 0 otherwise. MDEPS=1 if the respondent is married with dependents; 0 otherwise.
RURAL:	A dichotomous variable with a value of 1 for respondents living on a farm or in a rural area. A value of 0 is assigned otherwise.
REGION:	A set of 3 dichotomous variables indicating the respondent's residence in a particular area of the country. NEAST=1 if the respondent lives in the northeast; 0 otherwise. SOUTH=1 if the respondent lives in the south; 0 otherwise. WEST=1 if the respondent lives in the west; 0 otherwise.
EXPER:	A measure of potential work experience, calculated by subtracting the number of years of education plus six from the respondent's age.

TABLE I

DESCRIPTION OF VARIABLES
(Cont'd)

EXPERSQ:	EXPER squared.
EDUC:	The highest grade the respondent completed and received credit for, as of 1 May 1983.
PARTIC:	A measure of labor force participation, calculated by dividing the number of weeks the respondent worked in 1983 by 52.
OCCUP:	A set of six dichotomous variables representing employment in a managerial or professional (MANAG), technical (TECH), sales (SALES), clerical/administrative (ADMIN), service (SERV), or precision production (PROD) occupation. The base occupation is operators.
INTER1:	An interaction term for the level of education times ability.
AFQT:	A prospective measure of ability and acquired human capital. The standardized score on the AFQT.
CODING:	A prospective measure of ability and acquired human capital. The standardized score on the Coding Speed subtest of the ASVAB.

Based on the selection of the dependent and explanatory variables, the general form of the regression equation is:

$$\begin{aligned} LINC83 = {} & a_0 + b_1 EDUC + b_2 EXPER + b_3 EXPERSQ \\ & + b_4 AFQT + b_5 GENDER + b_6 BLACK + b_7 OTHER \\ & + b_8 SDEPS + b_9 MNONE + b_{10} MDEPS + b_{11} RURAL \\ & + b_{12} NEAST + b_{13} SOUTH + b_{14} WEST \\ & + b_{15} PARTIC + b_{16} MANAG + b_{17} TECH + b_{18} SALES \\ & + b_{19} ADMIN + b_{20} SERV + b_{21} PROD + b_{22} INTER1 \end{aligned}$$

D. INTERPRETING THE COEFFICIENTS IN SEMILOGARITHMIC EQUATIONS

In a semilogarithmic equation, the coefficients of continuous explanatory variables can be interpreted as the relative effect of that variable on the dependent variable (Kaufman, 1986, p. 307). The rate of return to that variable is simply 100 times the coefficient.

Halvorsen and Palmquist point out that this interpretation is not correct for the coefficients of dichotomous variables (Halvorsen and Palmquist, 1980). For a coefficient b for a dichotomous explanatory variable, the relative effect on the dependent variable is:

$$e^b - 1$$

All of the coefficients of dichotomous variables listed in the tables in this study are unadjusted. However, any reference to the relative effect or rate of return to such variables is calculated from the adjusted coefficient.

Calculating the return to variables which include a squared term involves taking the first derivative of the equation with respect to the variable in question (Kaufman, 1986, p. 530). Thus, the relative effect of EXPER on Y in the equation above is calculated by:

$$b_2 + 2b_3 EXPER$$

The same process is used to calculate the return to variables which are included in an interaction term. For example, the relative effect of ability on Y is:

$$b_4 + b_{22}EDUC$$

and the effect of education is:

$$b_1 + b_{22}AFQT$$

III. DATA ANALYSIS

A. DESCRIPTIVE STATISTICS

The 1984 round of the NLS-Youth sample contains 12,069 observations. The reduced sample used in this study, obtained by applying the constraints described in the previous chapter, contained 4,072 observations. This reduced sample was 56.2 percent male and 69.8 percent unmarried. The respondents' ages ranged from 18 to 26, with a mean of 22.5 years. The racial composition of the sample was 76.7 percent white, 18.1 percent black, and 4.7 percent non-black minorities. By region, 39.0 percent of the respondents lived in the south, 20.3 percent in the northeast, 19.8 percent in the west, and the remaining 20.5 percent in the north central region of the U.S. Those residing on farms or in rural areas constituted 13.4 percent of the sample. The mean education level of the sample was 12.5 years, with 33 percent having completed at least one year of college. The mean annual income of the respondents was $13,508. Sixty-eight percent of the sample worked the entire 52 weeks in 1983, while another 18.9 percent worked between 45 and 51 weeks. Another majority (86.4 percent) of the respondents normally worked at least 40 hours per week. Appendix C provides summary statistics for the aggregate sample and for each sample subgroup used in the analysis.

B. RESULTS

1. Aggregate Sample

Using the aggregate sample of 4,072 individuals, the model was first estimated without an ability measure. Table II contains the regression and beta coefficients of EDUC, AFQT, CODING and INTER1, their significance levels, and the explanatory powers for all three models, for all subsamples

TABLE II

COMPARISON OF EDUCATION AND ABILITY COEFFICIENTS

Aggregate

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.085	.347***	.071	.290***	.077	.314***
AFQT	--	--	.004	.275***	--	--
CODING	--	--	--	--	.005	.108
INTER1	--	--	-.0001	-.132	-.00002	-.001
N = 4072						
R^2	.309		.326		.319	
Adj R^2	.305		.322		.315	

Female

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.074	.335***	.055	.249***	.080	.362***
AFQT	--	--	.002	.145	--	--
CODING	--	--	--	--	.007	.148
INTER1	--	--	.00002	.022	-.0002	-.094
N = 1785						
R^2	.313		.329		.320	
Adj R^2	.306		.320		.312	

Male

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.089	.342***	.076	.294***	.074	.284***
AFQT	--	--	.006	.337***	--	--
CODING	--	--	--	--	.005	.096
INTER1	--	--	-.0002	-.201	.00007	.023
N = 2287						
R^2	.287		.308		.302	
Adj R^2	.280		.301		.295	

* Significant at the 0.10 level
** Significant at the 0.05 level
*** Significant at the 0.01 level

TABLE II
COMPARISON OF EDUCATION AND ABILITY COEFFICIENTS
(Cont'd)

Female/Less Than High School Diploma

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.100	.297***	.113	.330**	.403	1.175**
AFQT	--	--	.014	.702	--	--
CODING	--	--	--	--	.069	1.886*
INTER1	--	--	-.001	-.566	-.007	-2.219*
N = 129						
R^2	.317		.314		.317	
Adj R^2	.194		.168		.170	

Male/Less Than High School Diploma

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.064	.154***	.068	.165**	.043	.104
AFQT	--	--	.016	.618	--	--
CODING	--	--	--	--	-.001	-.028
INTER1	--	--	-.001	-.547	.0003	.066
N = 430						
R^2	.208		.214		.207	
Adj R^2	.169		.168		.160	

Female/High School Diploma

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	--	--	--	--	--	--
AFQT	--	--	.002	.142***	--	--
CODING	--	--	--	--	.004	.094***
INTER1	--	--	--	--	--	--
N = 923						
R^2	.238		.252		.245	
Adj R^2	.223		.236		.229	

* Significant at the 0.10 level
** Significant at the 0.05 level
*** Significant at the 0.01 level

TABLE II
COMPARISON OF EDUCATION AND ABILITY COEFFICIENTS
(Cont'd)

Male/High School Diploma

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	--	--	--	--	--	--
AFQT	--	--	.003	.181***	--	--
CODING	--	--	--	--	.007	.129***
INTER1	--	--	--	--	--	--
N = 1247						
R^2	.237		.273		.262	
Adj R^2	.225		.260		.250	

Female/Some College

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.036	.067	-.088	-.165	.011	.021
AFQT	--	--	-.025	-1.679**	--	--
CODING	--	--	--	--	-.004	-.088
INTER1	--	--	.002	1.896**	.0005	.156
N = 451						
R^2	.283		.310		.289	
Adj R^2	.250		.275		.252	

Male/Some College

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.012	.017	.187	.270**	.629	.909***
AFQT	--	--	.042	2.329***	--	--
CODING	--	--	--	--	.173	2.748***
INTER1	--	--	-.003	-2.342***	-.012	-2.892***
N = 384						
R^2	.263		.303		.311	
Adj R^2	.224		.260		.268	

* Significant at the 0.10 level
** Significant at the 0.05 level
*** Significant at the 0.01 level

TABLE II
COMPARISON OF EDUCATION AND ABILITY COEFFICIENTS
(Cont'd)

Female/Four Year Degree or Higher

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.096	.121**	-.059	-.076	-.168	-.216
AFQT	--	--	-.028	-1.454	--	--
CODING	--	--	--	--	-.069	-1.431
INTER1	--	--	.002	1.609	.004	1.559
N = 282						
R^2	.243		.259		.249	
Adj R^2	.187		.197		.187	

Male/Four Year Degree or Higher

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	-.030	-.032	-.721	-.739	-.205	-.210
AFQT	--	--	-.119	-4.938	--	--
CODING	--	--	--	--	-.046	-.826
INTER1	--	--	.008	5.370	.003	1.033
N = 226						
R^2	.264		.303		.287	
Adj R^2	.194		.227		.209	

Service Occupation/Less Than High School Diploma

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.032	.080	.104	.262*	.412	1.037**
AFQT	--	--	.041	1.904	--	--
CODING	--	--	--	--	.097	2.190**
INTER1	--	--	-.004	-1.975*	-.009	-2.526**
N = 103						
R^2	.383		.401		.409	
Adj R^2	.285		.276		.287	

* Significant at the 0.10 level
** Significant at the 0.05 level
*** Significant at the 0.01 level

TABLE II
COMPARISON OF EDUCATION AND ABILITY COEFFICIENTS
(Cont'd)

Production Occupation/Less Than High School Diploma

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.075	.170	.049	.106	-.278	-.604
AFQT	--	--	.003	.106	--	--
CODING	--	--	--	--	-.088	-1.582
INTER1	--	--	.0001	.039	.009	1.802
N = 107						
R^2	.175		.187		.187	
Adj R^2	.050		.034		.033	

Operator Occupation/Less Than High School Diploma

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.061	.057**	.057	.147	-.023	-.059
AFQT	--	--	.010	.397	--	--
CODING	--	--	--	--	-.015	-.334
INTER1	--	--	-.001	-.308	.002	.471
N = 239						
R^2	.229		.239		.236	
Adj R^2	.180		.181		.177	

Sales Occupation/High School Diploma

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	--	--	--	--	--	--
AFQT	--	--	.004	.186***	--	--
CODING	--	--	--	--	.007	.149**
INTER1	--	--	--	--	--	--
N = 181						
R^2	.432		.468		.459	
Adj R^2	.387		.421		.411	

* Significant at the 0.10 level
** Significant at the 0.05 level
*** Significant at the 0.01 level

TABLE II
COMPARISON OF EDUCATION AND ABILITY COEFFICIENTS
(Cont'd)

Administrative Occupation/High School Diploma

Variable	No Ability b	No Ability beta	AFQT b	AFQT beta	CODING b	CODING beta
EDUC	--	--	--	--	--	--
AFQT	--	--	.002	.160***	--	--
CODING	--	--	--	--	.005	.125***
INTER1	--	--	--	--	--	--
N = 529						
R^2	.198		.224		.217	
Adj R^2	.178		.201		.195	

Service Occupation/High School Diploma

Variable	No Ability b	No Ability beta	AFQT b	AFQT beta	CODING b	CODING beta
EDUC	--	--	--	--	--	--
AFQT	--	--	.003	.197***	--	--
CODING	--	--	--	--	.006	.136***
INTER1	--	--	--	--	--	--
N = 239						
R^2	.229		.240		.224	
Adj R^2	.180		.208		.191	

Production Occupation/High School Diploma

Variable	No Ability b	No Ability beta	AFQT b	AFQT beta	CODING b	CODING beta
EDUC	--	--	--	--	--	--
AFQT	--	--	.002	.123**	--	--
CODING	--	--	--	--	.005	.078
INTER1	--	--	--	--	--	--
N = 315						
R^2	.279		.295		.288	
Adj R^2	.247		.260		.253	

* Significant at the 0.10 level
** Significant at the 0.05 level
*** Significant at the 0.01 level

TABLE II
COMPARISON OF EDUCATION AND ABILITY COEFFICIENTS
(Cont'd)

Operator Occupation/High School Diploma

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	--	--	--	--	--	--
AFQT	--	--	.003	.166***	--	--
CODING	--	--	--	--	.008	.149***
INTER1	--	--	--	--	--	--
N = 582						
R^2	.218		.241		.239	
Adj R^2	.200		.221		.219	

Sales Occupation/Some College

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.026	.039	-.109	-.163	-.076	-.113
AFQT	--	--	-.023	-1.273	--	--
CODING	--	--	--	--	-.018	-.332
INTER1	--	--	.002	1.500	.002	.007
N = 102						
R^2	.384		.414		.402	
Adj R^2	.283		.295		.281	

Administrative Occupation/Some College

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.029	.052	.075	.133	.266	.471
AFQT	--	--	.013	.866	--	--
CODING	--	--	--	--	.062	1.427
INTER1	--	--	-.001	-.815	-.004	-1.467
N = 282						
R^2	.231		.243		.244	
Adj R^2	.190		.196		.197	

* Significant at the 0.10 level
** Significant at the 0.05 level
*** Significant at the 0.01 level

TABLE II
COMPARISON OF EDUCATION AND ABILITY COEFFICIENTS
(Cont'd)

Service Occupation/Some College

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.022	.035	.145	.241	.837	1.390***
AFQT	--	--	.034	2.183	--	--
CODING	--	--	--	--	.208	4.259**
INTER1	--	--	-.002	-2.147	-.015	-4.677**
N = 148						
R^2	.241		.240		.261	
Adj R^2	.160		.140		.164	

Managerial Occupation/Four Year Degree or Higher

	No Ability		AFQT		CODING	
Variable	b	beta	b	beta	b	beta
EDUC	.055	.076	-.033	-.284	-.399	-.528
AFQT	--	--	-.010	-.443	--	--
CODING	--	--	--	--	-.118	-2.044
INTER1	--	--	.001	.719	.008	2.374
N = 241						
R^2	.194		.241		.219	
Adj R^2	.144		.186		.162	

* Significant at the 0.10 level
** Significant at the 0.05 level
*** Significant at the 0.01 level

examined. The coefficients of INTER1 are carried out to four or five digits when necessary to indicate that they are not truly zero. The fact that they are not zero is important when calculating the returns to education and ability. The remaining regression and beta coefficients, and actual significance levels are presented in Appendix D.

Comparing the three model results for returns to education shows the importance of including an ability measure in such equations. The rate of return to an additional year of education was 8.5 percent when the model was estimated without an ability measure. Including AFQT and INTER1 in the equation brought the coefficient of education down to 0.071, and including CODING and INTER1 brought it down to 0.077, while making it insignificant. The data are not sufficient to identify the returns to education for these two models, since the interaction term is insignificant in both cases. These results suggest that inclusion of an ability measure is important to obtaining an accurate estimate of returns to education. It is important to emphasize that two changes are being made when the model is estimated with an ability proxy. Along with adding the ability variable, an interaction term is also added, allowing the effects of ability and education to be interrelated. Any changes in the coefficients which result from including an ability measure are also the result of including the interaction term. Even though the coefficient of the interaction term is insignificant, the coefficient of EDUC would have been different if INTER1 had not been included.

Among the ability measures and interaction terms, only AFQT was significant. Although it was relatively small in magnitude, with a coefficient of only 0.004, it was significant at the 0.01 level. The coefficient of CODING was also small at 0.005, but was not significantly different from zero. AFQT is a better predictor of earnings than CODING, for this sample, since it was the only significant ability proxy.

Despite its insignificance, CODING also performs as an ability measure. Although its coefficient was not significantly different from zero, its inclusion did slightly increase the adjusted R^2 of the model, implying that it is slightly related to earnings. (Studenmund and Cassidy, 1987, p. 129). Had it not increased the adjusted R^2, it could have been argued that CODING was an irrelevant variable. However, even an irrelevant variable could be an ability measure, in the sense that it could refine the coefficients on other variables. A truly irrelevant variable would not change the coefficients on other included variables (Studenmund and Cassidy, 1987, p. 129).

The effect of each ability measure on the adjusted R^2 also tells us whether or not the ability measure is useful in helping to explain earnings differentials for the sample. For the aggregate data, both AFQT and CODING increased the adjusted R^2 over its value without an ability measure, although these increases were small. These small increases indicate that the two sets of ability measures are only slightly related to earnings. The fact that the overall (unadjusted) R^2 is larger for the AFQT model indicates that it is more useful than CODING in explaining earnings variations.

2. Gender Subgroups

Table II shows some major differences in both the size and significance of coefficients between male and female groups.

For the female sub-sample, inclusion of AFQT in the equation decreased the coefficient of education from 0.074 to 0.055. Including CODING in the equation caused the coefficient of education to increase to 0.080. With a larger sample, the returns to education may be smaller for the AFQT and CODING models, since INTER1 may then be significant. However, none of the ability measures or their interaction terms were significant. Since the adjusted R^2 was higher for both the AFQT and CODING models than for the model without an ability measure, both ability measures did contribute to explaining the variance in earnings.

For the male subgroup, the presence of AFQT decreased the coefficient of education from 0.089 to 0.076, while CODING decreased it to 0.074. Again, these returns to education may be smaller in a larger sample, where INTER1 may be significant. The fact that AFQT is the only significant ability proxy indicates that AFQT performs better as a measure of ability for this sample. Again, neither interaction term was significant.

The R^2 values indicate that the AFQT model is more useful in explaining earnings differentials for this sample than the CODING model is. This was expected, given that AFQT was shown to be better at refining the estimated returns to education.

3. Educational Subgroups by Gender

a. Less than a High School Diploma

The education and ability coefficients for males and females without a high school diploma can also be found in Table II. These results can be compared with each other, or with the aggregate results by gender.

Including one of the ability measures in the regression equation resulted in some noteworthy changes in the education coefficients. For the females, AFQT caused the coefficient of education to increase from 0.100 to 0.113, while remaining significant. Again, no rate of return could be calculated because the coefficient of the interaction term was insignificant. For the CODING model, the interaction coefficient was significant. Taking INTER1 into account, the inclusion of CODING caused the rate of return to education to decrease from 10.0 percent to 8.9 percent. In that equation, both CODING and INTER1 were significant at the 0.10 level. CODING appears to be a better predictor of earnings for this group than AFQT.

The coefficient on the interaction term is negative for this subgroup, which is not surprising. It is entirely plausible that there is a limit to what an employer will pay someone without a high school diploma, regardless of his/her level of education or ability.

For the males without a high school diploma, none of the ability measures or interaction terms was significant. AFQT increased the coefficient of education from 0.064 to 0.068, keeping it significant at the 0.05 level. CODING decreased the coefficient of education, and made it insignificant.

For individuals without a high school diploma, inclusion of one of the ability measures did change the coefficient of education, but generally produced a model which was less useful in explaining earnings differentials. Apparently there are factors involved in the earnings of individuals in this low-education group which are not included in this model. The lowest R^2 values in this study were found for this educational group.

b. High School Diploma

The models for the high school diploma subsets do not contain the EDUC or INTER1 variables, since all respondents have exactly twelve years of education. Some interesting comparisons are still possible among the models.

As shown in Table II, both ability measures were significant at the 0.01 level for both males and females. For the female subset, the beta coefficient for AFQT was larger, implying that AFQT has more utility as an ability measure for this group. Additionally, the AFQT model had an R^2 higher than that of the other two models, indicating that the AFQT model is more useful in helping to explain earnings differentials than the CODING model is. Including AFQT increased the explanatory power from 0.238 to 0.252, an increase of almost 6 percent. CODING also increased the R^2 and adjusted R^2, but not as substantially.

A similar situation existed for the male group of high school graduates. Again, the beta coefficient was higher for AFQT than for CODING. And, again, the AFQT model had the highest R^2 of the three models. AFQT increased the overall explanatory power from 0.237 to 0.273, an increase of 15 percent. AFQT seems to contribute more to explaining male earnings differentials than female differentials, for those with no more than a high school diploma.

c. Some College, but Less than a Four Year Degree

This subset consists of respondents who reported at least one year of college, but not a four year degree. The data set did not allow the selection of individuals with a two year degree, so they are included in this group.

The first result which stands out is that the coefficient of education was insignificant in all three models for females. It appears that an additional year of college, without earning a four year degree, has a negligible effect on earnings for women. This is not surprising, since it is conceivable that employers reward employees for earning a degree, rather than for attending college. Inclusion of an ability measure did change the EDUC coefficients, but kept them insignificant. The return to an additional year of education for a woman with the mean AFQT score of 52.2 would be 1.6 percent, as opposed to 3.6 percent in the basic model. The inclusion of CODING in the equation caused the coefficient of education to decrease to 0.011. Again, no rate of return could be calculated for this sample because the coefficient on INTER1 was not significantly different from zero.

As shown in Table II, AFQT and its interaction term were both significant at the 0.05 level for females, while CODING and its interaction term were both insignificant. In this case the coefficient on AFQT was negative, while the coefficient on INTER1 was positive. The positive and significant interaction term implies that individuals with more education will have greater returns to ability, and those with higher ability will have greater returns to education. The negative sign on AFQT is small enough to be offset by the positive interaction term, at all relevant levels of education, when calculating the return to ability. However, the return to an additional percentage point score on the AFQT gives a woman with one year of college a return of only 0.1 percent ($14), and a woman with three years of college a return of 0.5 percent ($68).

Since AFQT is the only significant ability proxy, it is the better predictor of earnings. The AFQT model is also the most useful for explaining earnings differentials in this subsample, since its R^2 is 10 percent higher than that of the basic model, while the CODING model R^2 is only 2 percent higher. Since CODING did improve the adjusted R^2, it does belong in the model. Its insignificance could be due to lack of variation within the sample.

The male subsample of respondents with some college produced unique results in that both ability measures and both interaction terms were significant at the 0.01 level. And, in this case, the inclusion of an ability measure caused the EDUC coefficient to become significant and the return to education to increase. Both of these results were unexpected, and may be due to the very small variation in education for this subgroup.

Both the CODING and AFQT models were superior to the basic model in explaining earnings differentials, as AFQT increased the R^2 by 16.1 percent and CODING increased it by 19.6 percent. CODING produced the larger change in the estimated return to education, and had the larger beta coefficient, making it the more useful measure of ability. At the mean CODING score of 49.4, the return to education was 3.6 percent.

In both the AFQT and CODING models, the coefficient on the ability measure was positive, while the interaction term was negative. This means that returns to education decrease as ability increases, and returns to ability decrease as education increases. This result is not surprising. It implies that, for males with some college, employers monetarily reward ability and education, but only up to a point. For instance, using the CODING model, a man with three years of college has a negative return to ability of 0.7 percent. Similarly, a man with a CODING score of 53 has a negative return to education of 0.7 percent. Having reached a high level of either factor, the employee can no longer reap monetary benefits by improving the other factor, without obtaining a four year degree.

d. Four Year Degree or Higher

Although the explanatory power of the models was higher overall for these subgroups than for the "less than high school diploma" subgroups, there were few significant variables. It appears that some of the traditional explanations for variations in earnings simply are not relevant for young people with higher levels of education.

To begin with, EDUC was insignificant and negative in all three models for the males. For the females, EDUC was significant in the basic model, but insignificant and negative in the AFQT and CODING models. This change in significance was unexpected, and may be the result of the small sample size and truncated sample.

Also insignificant for both the male and female subgroups were all of the ability-related variables. It seems that, having attained a college degree, any additional ability is irrelevant to earnings, for individuals in this young age group. For females, only the AFQT model exhibited any improvement in the adjusted R^2, while both ability models had higher adjusted R^2 values than the basic model for males. The fact that the ability proxies are insignificant could be due to insufficient variation within the sample.

4. Educational Subgroups by Occupation

a. Less than a High School Diploma

Table II reveals the education and ability results for the three occupations containing at least one hundred respondents with less than a high school diploma. The occupations were: service, production and operators.

For service occupations, CODING and its interaction term were significant at the 0.05 level. The interaction term for AFQT was significant at the 0.10 level, but AFQT was not. Inclusion of both ability measures caused the coefficients of education to increase and become significant. Again, this is probably attributable to the small, truncated sample.

The inclusion of CODING increased the return to education from 3.2 percent to 3.9 percent. The return to CODING, at the mean level of education of 10.0, was 0.7 percent.

Results for the production occupations were very different from those for the service occupations. First, neither of the ability measures was significant; nor were the interaction terms. Their inclusion produced relatively large changes in the coefficients of education, but none of the EDUC coefficients were significant. Including CODING in the equation caused the coefficient of education to decrease from 0.075 to -0.278. In this same equation, the coefficients on both EDUC and CODING were negative. Inclusion of AFQT caused the coefficient of EDUC to decline to 0.049. This sample is very small, which probably contributes to the insignificant coefficients and unexpected signs. The R^2 values were also relatively low, ranging from 0.175 to 0.187.

As with the production occupations, none of the ability measures or interaction terms were significant for the operator occupations. EDUC was significant at the 0.05 level in the basic model, but became insignificant when either ability measure was added. As with the production occupations, inclusion of CODING resulted in a negative coefficient for EDUC and INTER1. AFQT produced a decrease in the coefficient of education, from 0.061 to 0.057; but, EDUC and INTER1 were insignificant.

b. High School Diploma

There were five occupations containing more than one hundred individuals with a high school diploma. The occupations were: sales, administrative, service, production and operator. Again, there were no education or interaction terms in this analysis, due to the common education level.

Table II reveals that both ability measures were significant, for all but one of the five occupations. AFQT acted as the best ability measure for each subgroup, since the beta coefficient of AFQT was larger than that of CODING and the R^2 was largest for the AFQT model. This corresponds with the results for the two gender subgroups of high school graduates.

For sales occupations, the rate of return to AFQT was 0.4 percent, significant at the 0.01 level. The explanatory power for this group was relatively high at 0.468. The implication is that this model does a relatively good job of explaining earnings differentials for high school graduates in sales occupations. This was the highest R^2 achieved for all subgroups in the study.

For administrative occupations, AFQT provided a rate of return of 0.2 percent. The explanatory power for this subgroup was considerably lower, with the AFQT model having an R^2 of 0.201.

In service occupations, AFQT provided a rate of return of 0.3 percent. The explanatory power of the model was slightly better than for administrative workers at 0.240.

For production occupations, the rate of return to AFQT was 0.2 percent, significant at the 0.03 level. CODING was not significant in explaining earnings differentials for this group. The explanatory power of the AFQT model for this subgroup was 0.295.

For operator occupations, the difference in performance between the AFQT and CODING models was smaller. The beta coefficient of AFQT was slightly higher than that of CODING, with both significant at the 0.01 level. The explanatory power of the AFQT model was only 0.002 better than for the CODING model (0.241 vice 0.239). This still contradicts the original hypothesis, in which CODING was expected to be the better ability measure for operator occupations. The rate of return to AFQT was 0.3 percent, consistent with that for the other occupations in this education category.

c. Some College but Less Than a Four Year Degree

Among respondents with some college but not a four year degree, there were three occupations with enough observations for this analysis: sales, administrative and service.

For individuals with some college and employed in a sales occupation, no ability proxy, interaction term or education coefficient was significant. Inclusion of either ability proxy caused the coefficient of education to become negative. Both ability proxies were also negative. Again, these unexpected results are probably largely due to the small and truncated sample.

As shown in Table II, neither ability proxy or interaction term was significant in either model for individuals with some college in administrative occupations. The inclusion of AFQT caused the coefficient of education to increase from 0.029 to 0.075; inclusion of CODING caused it to increase to 0.266. None of these EDUC coefficients were significant. Again, it is possible that these EDUC coefficients would be smaller if the sample size were larger and the interaction coefficients were significant.

For service occupations, CODING and its interaction term were significant at the 0.02 level, while AFQT and its interaction term were insignificant. AFQT caused the coefficient of education to increase from 0.022 to 0.145, but EDUC was insignificant in these two models. CODING caused the estimated return to education to increase to 10.1 percent, while becoming significant. This large and significant coefficient implies that EDUC is highly correlated with earnings, and is therefore very useful in explaining earnings differentials for this group. The change in significance was unexpected, and probably reflects the decreased bias of the CODING model. The negative and significant interaction term implies that the return to education will decrease as the level of ability increases. Diminishing returns to education and ability appear to be relatively common for subgroups which are "between degrees," such as "less than a high school diploma," or "some college but not a four year degree."

d. Four Year Degree or Higher

Among respondents with a four year degree or more, the only occupation with at least one hundred responses was managerial-professional. It is unfortunate that no other education group had a sufficient number of responses in this occupation, in order that they might be compared.

Table II shows that none of the education or ability coefficients were significant for this subgroup. The inclusion of either AFQT or CODING made the coefficient of education negative. The expectation was that AFQT would be more useful for explaining earnings differentials among individuals with a higher level of education. However, the lack of significance of the ability proxies implies that education has no significant effect on earnings for this sample. The negative signs on the coefficients is also an unexpected result, and suggests that the results were affected by the small and truncated sample.

C. SUMMARY OF RESULTS

Table III provides a comparison of the rates of return to education for each model, for each subgroup, with an indication of which coefficients were significant at the 0.10 level or better. Table IV provides a comparison of the rates of return to ability for the AFQT and CODING models, for each subgroup, with an indication of which coefficients were significant. These two tables summarize the results presented in this chapter.

Table III shows certain patterns for the significance of returns to education. The rate of return to education was significant only in the basic model for the three most heterogeneous groups, the aggregate, females and males. In all three cases, the return was largest for the basic model, decreasing and becoming insignificant when either AFQT or CODING was added. As shown in Table IV, neither ability coefficient was significant for these groups.

Educational attainment was inconsistently significant among the five groups of respondents with less than a high school diploma. For the female subgroup, the return to education was significant in the basic model, decreasing and remaining significant in the CODING model. The CODING coefficient was also significant. For the male and operator subgroups, the return to education was significant in the basic model, but became insignificant when either ability proxy was added. For service occupations, the return to education was insignificant in the basic model, but became significant when CODING was added. The CODING coefficient

TABLE III

COMPARISON OF THE RATES OF RETURN TO EDUCATION FOR EACH MODEL (In percent, evaluated at the subgroup means)

Sample	N	w/o ability	AFQT	CODING
Aggregate	4072	8.5*	6.7	7.6
Female	1785	7.4*	5.6	7.0
Male	2287	8.9*	6.7	7.7
Less Than High School Diploma				
Female	129	10.0*	9.2	8.9*
Male	430	6.4*	5.0	5.5
Service Occupation	103	3.2	3.3	3.9*
Production Occupation	107	7.5	5.1	8.2
Operator Occupation	239	6.1*	4.0	5.6
Some College				
Female	451	3.6	1.6	3.8
Male	384	1.2	2.0*	3.6*
Sales Occupation	102	2.6	-0.5	2.5
Administrative Occ.	282	2.9	2.5	1.5
Service Occupation	148	2.2	4.5	10.1*
Four Year Degree or Higher				
Female	282	9.6*	9.0	5.6
Male	226	-3.0	-10.3	-4.5
Managerial Occupation	241	5.5	4.3	3.9

* All coefficients used in calculating the returns are significant at the 0.10 level or better

TABLE IV

COMPARISON OF THE RATES OF RETURN TO ABILITY FOR EACH MODEL (In percent, evaluated at the subgroup means)

Sample	N	AFQT	CODING
Aggregate	4072	0.3	0.5
Female	1785	0.2	0.4
Male	2287	0.4	0.6
Less Than High School Diploma			
Female	129	0.1	0.1*
Male	430	0.6	0.2
Service Occupation	103	0.1	0.7*
Production Occupation	107	0.4	-0.1
Operator Occupation	239	0.0	0.4
High School Diploma			
Female	923	0.2*	0.4*
Male	1247	0.3*	0.7*
Sales Occupation	181	0.4*	0.7*
Administrative Occ.	529	0.2*	0.5*
Service Occupation	239	0.3*	0.6*
Production Occupation	315	0.2*	0.5
Operator Occupation	582	0.3*	0.8*
Some College			
Female	451	0.2*	0.3
Male	384	0.1*	1.0*
Sales Occupation	102	0.4	0.9
Administrative Occ.	282	-0.1	0.8
Service Occupation	148	0.7	0.3*
Four Year Degree or Higher			
Female	282	0.4	-0.4
Male	226	1.1	0.3
Managerial Occupation	241	0.6	1.2

* All coefficients used in calculating the returns are significant at the 0.10 level or better

was also significant. Returns to education were insignificant in all models for production occupations, as were the returns to the ability proxies.

As shown in Table IV, six of the seven subsets of high school graduates had significant coefficients for both AFQT and CODING. In each case, the beta coefficient for AFQT was higher. This implies that AFQT has a larger effect on earnings for these subgroups, controlling for the different units of measurement. Only for the subgroup of production occupations was the return to CODING insignificant.

The subgroups of respondents with some college, but no college degree, exhibited diverse results. For women, none of the returns to education were significant, but the return to AFQT was significant. For men, including either ability measure in the equation caused the education coefficient to become larger and significant in both models. Again, the interaction term was negative in both models. Both AFQT and CODING were also significant, with CODING having the larger beta coefficient and larger effect on the returns to education. Among the sales and administrative occupations, none of the education or ability measures were significant. For service occupations, the inclusion of CODING caused the return to education to become significant, and was both large and significant itself.

There were three subgroups of respondents with at least a four year degree. For the female subgroup, education was significant in the basic model, but decreased in magnitude and became insignificant when an ability measure was added to the equation. For the male and managerial occupation subgroups, neither the returns to education nor the ability measures were significant for any model.

The next chapter discusses the conclusions which can be drawn from these results. Recommendations for further research are also made.

IV. CONCLUSIONS AND RECOMMENDATIONS

A number of conclusions can be drawn from the results of this study. None of these findings are new; they are all confirmations of earlier findings. First and foremost is that the inclusion of an ability proxy in human capital earnings functions does affect the estimates of the returns to education. In all cases, including either AFQT or CODING produced a change in the estimated return to education. This implies that, when no ability measure is included in the equation, the use of human capital earnings equations results in biased estimates of the returns to education. In most cases, this bias is overestimation, but in a few cases the return to education was underestimated when no ability proxy was included in the equation. This result is puzzling, since none of the simple correlations between ability and education were negative. A likely cause is insufficient variation in education due to the truncated sample.

The second conclusion, closely related to the first, is that an ability measure is essential to a human capital earnings function, since its exclusion produces omitted variable bias. Exceptions exist for the subgroups with less than a high school diploma, where inclusion of an ability measure does not improve the adjusted R^2 of the equation. For individuals in these subgroups, ability measures were not related to earnings. For the eighteen other subgroups, inclusion of at least one of the ability measures improved the model's adjusted explanatory power. Coupled with the theoretical basis for inclusion of an ability measure, the changes produced in the other coefficients indicate that the ability measure contributes significantly to explaining earnings differentials for those groups. CODING and AFQT measure some earnings-related factor which both includes education and is separate from education. The fact that the ability proxies refine the estimated return to education indicates that they are correlated with education. The fact that they contribute significantly to explaining earnings differentials indicates that they also measure factors which are separate from education, such as motivation, school quality and family background.

As shown in Table III in the previous chapter, the estimated rates of return to education vary a great deal among subgroups. In general, the rate of return seems to decline as the education level of the subgroup increases. This is not a new finding. It is likely that employers view each year of education prior to a high school diploma as being more valuable than each year after that milestone has been reached.

It can also be seen from Table III that the number of subgroups for which years of education are significant decreases as the level of education increases. This may be largely due to smaller sample sizes and less variation in years of education for the subgroups with more education. These facts may also contribute to the negative signs on the education coefficients for sales occupations with some college, and males with a four year degree. It also implies that the attainment of the next higher diploma/degree tends to have a greater effect on earnings than any increments in education between degrees. This finding is also well documented by earlier studies.

Table IV shows that the range of values for the estimated returns to the ability proxies is much smaller than the range for returns to education. The estimated returns to ability are themselves much smaller, too, and there is no real pattern among the subgroups. The sizes of these coefficients are consistent with those found in the Knowles study (Knowles, 1986). It was hypothesized that the return to ability would increase as the level of education increased.

It is true that the two largest rates of return occurred for the male and managerial occupation subgroups with at least a four year degree, but other high and low values did not form any pattern by education level. Perhaps the most interesting comparisons among subgroups are the differences rather than the similarities. The magnitudes of the returns to ability vary between genders and among occupations; within occupations, they vary among educational levels.

Significant coefficients for the ability measures were concentrated among the subgroups of respondents with a high school diploma. It is possible that the generally larger samples for the high school diploma groups provided more variation and, therefore, more accurate results. It is also possible that the returns to ability are more accurately measured among individuals with completely identical education levels. The coefficients of AFQT found here are more highly significant than was found in the Griliches and Mason study (Griliches and Mason, 1972). Since the respondents in their study were older, ranging in age from 24 to 42, it is possible that the effect of ability decreases over time, as job experience increases.

It is strongly recommended that this research be continued using subsequent iterations of the National Longitudinal Survey. The NLS and the availability of these ASVAB results provide an unprecedented opportunity to observe the relationship among education, ability and earnings over time. This study has shown that both AFQT and CODING act as ability measures in that they help to refine the estimated returns to education. These results apply to early labor force earnings. It will be interesting to observe any changes to these results as this sample gains labor force experience.

The results of this study show that both AFQT and CODING perform as measures of ability, and that which one performs better depends on the subgroup being examined. This study also shows that higher civilian earnings are indeed earned by individuals with higher scores on these measures, and that the size of this earnings premium depends on the individual's level of education and occupation. This implies that individuals with higher ability have a stronger incentive to leave the military. This knowledge is of value to the military services in structuring incentives which will result in recruiting and retaining high-quality personnel.

APPENDIX A

ASVAB FORM 8A SUBTESTS

General Science (20 items, 11 minutes). Items are drawn from biology, medicine, chemistry, and physics. This test measures basic factual knowledge at a level appropriate to secondary school general science courses.

Arithmetic Reasoning (30 items, 36 minutes). Often called "word problems." The items in this subtest require the subjects to solve problems described in short passages. Advanced mathematics is not required.

Word Knowledge (35 items, 11 minutes). Essentially a vocabulary test. The subject is given a word and asked to choose which of four other words is closest in meaning.

Paragraph Comprehension (15 items, 13 minutes). Designed to measure how well subjects can acquire information from written passages. Subjects are required to read short passages and answer questions about them.

Numerical Operations (50 items, 3 minutes). This covers basic arithmetic operations, which subjects are asked to solve as quickly as possible. Scores depend to a great extent on speed and accuracy.

Coding Speed (84 items, 7 minutes). Like numerical operations, this subtest emphasizes speed and accuracy. Given the code numbers for certain words at the top of the page in the test booklet, subjects are asked to mark spaces on their answer sheets corresponding to the code numbers of the words.

Auto and Shop Information (25 items, 11 minutes). This subtest measures the subjects' specific knowledge of the tools and terms associated with the repair and maintenance of vehicles.

Mathematics Knowledge (25 items, 24 minutes). The questions in this subtest concern subjects that are normally taught in high school classes, such as algebra, geometry, and trigonometry.

Mechanical Comprehension (25 items, 19 minutes). Items in this subtest showed pictures related to basic machines such as pulleys, levers, gears, and wedges; to answer the questions, subjects had to visualize how the pictured objects would operate.

Electronics Information (20 items, 9 minutes). This subtest measures the subjects' familiarity with electrical equipment, knowledge of electronics terminology, and ability to solve simple electrical problems.

Source: Johnson, 1983

APPENDIX B

ASVAB 8A CONVERSION OF RAW TEST SCORES TO STANDARD SCORES

RAW	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI
0	20	26	20	20	20	22	24	29	24	23
1	20	27	20	20	20	22	26	30	25	25
2	22	28	20	23	20	23	28	32	27	27
3	24	30	20	26	20	23	30	33	29	30
4	26	31	21	29	20	24	31	35	31	32
5	28	32	22	32	20	25	33	37	33	34
6	30	34	24	35	21	25	35	38	35	37
7	32	35	25	38	22	26	37	40	37	39
8	34	36	26	41	23	26	39	41	38	42
9	36	38	28	44	24	27	40	43	40	44
10	38	39	29	47	25	28	42	44	42	46
11	40	40	30	50	26	28	44	46	44	49
12	42	42	31	53	27	29	46	48	46	51
13	44	43	33	56	28	29	48	49	48	53
14	46	45	34	59	28	30	49	51	50	56
15	48	46	35	62	29	31	51	52	52	58
16	50	47	37		30	31	53	54	53	60
17	52	49	38		31	32	55	55	55	63
18	54	50	39		32	32	57	57	57	65
19	56	51	41		33	33	58	58	59	68
20	58	53	42		34	34	60	60	61	70
21	60	54	43		35	34	62	62	63	
22	62	55	44		36	35	64	63	65	
23	64	57	46		37	35	66	65	67	
24	66	58	47		38	36	67	66	68	
25	68	59	48		39	37	69	68	70	
26		61	50		40	37				
27		62	51		41	38				
28		64	52		41	38				
29		65	54		42	39				
30		66	55		43	39				
31			56		44	40				
32			57		45	41				
33			59		46	41				
34			60		47	42				
35			61		48	42				
36					49	43				
37					50	44				
38					51	44				
39					52	45				
40					53	45				
41					53	46				
42					54	47				
43					55	47				
44					56	48				
45					57	48				
46					58	49				
47					59	50				
48					60	50				
49					61	51				

RAW	GS	AR	WK	PC	NO	CS	AS	MK	MC	EI
50					62	51				
51						52				
52						53				
53						53				
54						54				
55						54				
56						55				
57						56				
58						56				
59						57				
60						57				
61						58				
62						59				
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66						61				
67						62				
68						62				
69						63				
70						63				
71						64				
72						65				
73						65				
74						66				
75						66				
76						67				
77						68				
78						68				
79						69				
80						69				
81						70				
82						71				
83						71				
84						72				

APPENDIX C

SUMMARY STATISTICS

TABLE I

SUMMARY STATISTICS FOR AGGREGATE SAMPLE

Variable	N	Mean	Min	Max
AFQT	3893	42.245	1	99
CODING	3893	48.847	22	72
EDUC	4072	12.551	8	19
EXPER	4072	3.975	0	11
EXPERSQ	4072	20.817	0	121
GENDER	4072	.562	0	1
BLACK	4072	.181	0	1
OTHER	4072	.047	0	1
SDEPS	4071	.092	0	1
MNONE	4071	.152	0	1
MDEPS	4071	.150	0	1
RURAL	4068	.135	0	1
SOUTH	4072	.390	0	1
WEST	4072	.198	0	1
NEAST	4072	.203	0	1
PARTIC	4072	.960	.69	1
MANAG	3969	.103	0	1
TECH	3969	.042	0	1
SALES	3969	.092	0	1
ADMIN	3969	.237	0	1
SERV	3969	.167	0	1
PROD	3969	.128	0	1
OPER	3969	.232	0	1
INC83	4072	13508.00	4222	75001

TABLE II

SUMMARY STATISTICS FOR FEMALE RESPONDENTS

Variable	N	Mean	Min	Max
AFQT	1727	48.296	1	99
CODING	1727	52.087	23	72
EDUC	1785	12.904	8	19
EXPER	1785	3.666	0	11
EXPERSQ	1785	18.229	0	121
GENDER	--	--	--	--
BLACK	1785	.179	0	1
OTHER	1785	.048	0	1
SDEPS	1784	.101	0	1
MNONE	1784	.189	0	1
MDEPS	1784	.142	0	1
RURAL	1770	.112	0	1
SOUTH	1785	.403	0	1
WEST	1785	.185	0	1
NEAST	1785	.210	0	1
PARTIC	1785	.963	.69	1
MANAG	1778	.122	0	1
TECH	1778	.052	0	1
SALES	1778	.113	0	1
ADMIN	1778	.413	0	1
SERV	1778	.175	0	1
PROD	1778	.022	0	1
OPER	1778	.102	0	1
INC83	1785	11955.372	4300	75001

TABLE III

SUMMARY STATISTICS FOR MALE RESPONDENTS

Variable	N	Mean	Min	Max
AFQT	2166	42.832	1	99
CODING	2166	46.265	22	72
EDUC	2287	12.276	8	19
EXPER	2287	4.216	0	11
EXPERSQ	2287	22.837	0	121
GENDER	--	--	--	--
BLACK	2287	.181	0	1
OTHER	2287	.047	0	1
SDEPS	2287	.085	0	1
MNONE	2287	.123	0	1
MDEPS	2287	.156	0	1
RURAL	2278	.153	0	1
SOUTH	2287	.379	0	1
WEST	2287	.209	0	1
NEAST	2287	.198	0	1
PARTIC	2287	.958	.69	1
MANAG	2191	.087	0	1
TECH	2191	.034	0	1
SALES	2191	.074	0	1
ADMIN	2191	.094	0	1
SERV	2191	.159	0	1
PROD	2191	.215	0	1
OPER	2191	.338	0	1
INC83	2287	14719.832	4222	75001

TABLE IV

SUMMARY STATISTICS FOR FEMALE/LESS THAN HIGH SCHOOL DIPLOMA

Variable	N	Mean	Min	Max
AFQT	123	21.106	1	77
CODING	123	44.878	23	66
EDUC	129	9.667	8	11
EXPER	129	5.860	1	11
EXPERSQ	129	39.907	1	121
GENDER	--	--	--	--
BLACK	129	.085	0	1
OTHER	129	.101	0	1
SDEPS	129	.171	0	1
MNONE	129	.186	0	1
MDEPS	129	.202	0	1
RURAL	129	.147	0	1
SOUTH	129	.380	0	1
WEST	129	.318	0	1
NEAST	129	.163	0	1
PARTIC	129	.940	.69	1
MANAG	126	.016	0	1
TECH	126	.032	0	1
SALES	126	.119	0	1
ADMIN	126	.183	0	1
SERV	126	.294	0	1
PROD	126	.040	0	1
OPER	126	.317	0	1
INC83	129	9019.992	4300	21000

TABLE V

SUMMARY STATISTICS FOR MALE/LESS THAN HIGH SCHOOL DIPLOMA

Variable	N	Mean	Min	Max
AFQT	404	17.988	1	92
CODING	404	39.455	22	67
EDUC	430	9.800	8	11
EXPER	430	5.774	1	11
EXPERSQ	430	38.663	1	121
GENDER	--	--	--	--
BLACK	430	.219	0	1
OTHER	430	.070	0	1
SDEPS	430	.149	0	1
MNONE	430	.100	0	1
MDEPS	430	.198	0	1
RURAL	428	.194	0	1
SOUTH	430	.474	0	1
WEST	430	.200	0	1
NEAST	430	.167	0	1
PARTIC	430	.947	.69	1
MANAG	402	.020	0	1
TECH	402	.010	0	1
SALES	402	.017	0	1
ADMIN	402	.040	0	1
SERV	402	.164	0	1
PROD	402	.254	0	1
OPER	402	.495	0	1
INC83	430	11615.763	4222	38900

TABLE VI

SUMMARY STATISTICS FOR FEMALE/HIGH SCHOOL DIPLOMA

Variable	N	Mean	Min	Max
AFQT	889	42.029	1	99
CODING	889	51.417	23	72
EDUC	--	--	--	--
EXPER	923	4.106	0	8
EXPERSQ	923	21.229	0	64
GENDER	--	--	--	--
BLACK	923	.174	0	1
OTHER	923	.049	0	1
SDEPS	922	.107	0	1
MNONE	922	.201	0	1
MDEPS	922	.185	0	1
RURAL	916	.136	0	1
SOUTH	923	.401	0	1
WEST	923	.169	0	1
NEAST	923	.193	0	1
PARTIC	923	.961	.69	1
MANAG	920	.038	0	1
TECH	920	.027	0	1
SALES	920	.113	0	1
ADMIN	920	.454	0	1
SERV	920	.204	0	1
PROD	920	.033	0	1
OPER	920	.130	0	1
INC83	923	10945.117	4325	33000

TABLE VII

SUMMARY STATISTICS FOR MALE/HIGH SCHOOL DIPLOMA

Variable	N	Mean	Min	Max
AFQT	1174	40.857	1	99
CODING	1174	46.259	22	69
EDUC	--	--	--	--
EXPER	1247	4.356	0	8
EXPERSQ	1247	23.221	0	64
GENDER	--	--	--	--
BLACK	1247	.179	0	1
OTHER	1247	.047	0	1
SDEPS	1247	.085	0	1
MNONE	1247	.123	0	1
MDEPS	1247	.162	0	1
RURAL	1243	.167	0	1
SOUTH	1247	.362	0	1
WEST	1247	.206	0	1
NEAST	1247	.194	0	1
PARTIC	1247	.956	.69	1
MANAG	1191	.034	0	1
TECH	1191	.022	0	1
SALES	1191	.065	0	1
ADMIN	1191	.093	0	1
SERV	1191	.159	0	1
PROD	1191	.239	0	1
OPER	1191	.388	0	1
INC83	1247	14324.418	4237	75001

TABLE VIII

SUMMARY STATISTICS FOR FEMALE/SOME COLLEGE

Variable	N	Mean	Min	Max
AFQT	439	52.200	1	99
CODING	439	53.023	25	72
EDUC	451	13.647	13	15
EXPER	451	3.361	0	7
EXPERSQ	451	14.674	0	49
GENDER	--	--	--	--
BLACK	451	.251	0	1
OTHER	451	.051	0	1
SDEPS	451	.113	0	1
MNONE	451	.169	0	1
MDEPS	451	.100	0	1
RURAL	445	.074	0	1
SOUTH	451	.412	0	1
WEST	451	.233	0	1
NEAST	451	.193	0	1
PARTIC	451	.968	.69	1
MANAG	450	.093	0	1
TECH	450	.076	0	1
SALES	450	.120	0	1
ADMIN	450	.507	0	1
SERV	450	.153	0	1
PROD	450	.009	0	1
OPER	450	.042	0	1
INC83	451	12515.384	4300	75001

TABLE IX

SUMMARY STATISTICS FOR MALE/SOME COLLEGE

Variable	N	Mean	Min	Max
AFQT	369	55.843	1	99
CODING	369	49.436	29	71
EDUC	384	13.648	13	15
EXPER	384	3.326	0	7
EXPERSQ	384	14.185	0	49
GENDER	--	--	--	--
BLACK	384	.180	0	1
OTHER	384	.042	0	1
SDEPS	384	.044	0	1
MNONE	384	.122	0	1
MDEPS	384	.143	0	1
RURAL	381	.110	0	1
SOUTH	384	.341	0	1
WEST	384	.266	0	1
NEAST	384	.219	0	1
PARTIC	384	.964	.69	1
MANAG	376	.101	0	1
TECH	376	.056	0	1
SALES	376	.128	0	1
ADMIN	376	.144	0	1
SERV	376	.210	0	1
PROD	376	.184	0	1
OPER	376	.178	0	1
INC83	384	16061.802	4400	75001

TABLE X

SUMMARY STATISTICS FOR FEMALE/FOUR YEAR DEGREE OR MORE

Variable	N	Mean	Min	Max
AFQT	276	74.391	12	99
CODING	276	55.967	25	72
EDUC	282	16.152	16	19
EXPER	282	1.709	0	4
EXPERSQ	282	4.177	0	16
GENDER	--	--	--	--
BLACK	282	.124	0	1
OTHER	282	.018	0	1
SDEPS	282	.028	0	1
MNONE	282	.188	0	1
MDEPS	282	.039	0	1
RURAL	280	.075	0	1
SOUTH	282	.408	0	1
WEST	282	.103	0	1
NEAST	282	.316	0	1
PARTIC	282	.970	0	1
MANAG	282	.489	0	1
TECH	282	.106	0	1
SALES	282	.099	0	1
ADMIN	282	.230	0	1
SERV	282	.064	0	1
PROD	282	.004	0	1
OPER	282	.007	0	1
INC83	282	15709.145	4700	75001

TABLE XI

SUMMARY STATISTICS FOR MALE/FOUR YEAR DEGREE OR MORE

Variable	N	Mean	Min	Max
AFQT	219	77.329	12	99
CODING	219	53.511	28	72
EDUC	226	16.181	16	19
EXPER	226	1.991	0	4
EXPERSQ	226	5.310	0	16
GENDER	--	--	--	--
BLACK	226	.128	0	1
OTHER	226	.009	0	1
SDEPS	226	.035	0	1
MNONE	226	.168	0	1
MDEPS	226	.066	0	1
RURAL	226	.066	0	1
SOUTH	226	.354	0	1
WEST	226	.142	0	1
NEAST	226	.239	0	1
PARTIC	226	.979	.69	1
MANAG	222	.464	0	1
TECH	222	.104	0	1
SALES	222	.140	0	1
ADMIN	222	.108	0	1
SERV	222	.068	0	1
PROD	222	.063	0	1
OPER	222	.054	0	1
INC83	226	20527.416	5000	75000

TABLE XII

SUMMARY STATISTICS FOR SERVICE OCCUPATION/ LESS THAN HIGH SCHOOL DIPLOMA

Variable	N	Mean	Min	Max
AFQT	94	17.819	1	92
CODING	94	41.479	24	59
EDUC	103	10.039	8	11
EXPER	103	2.249	1	11
EXPERSQ	103	34.990	1	121
GENDER	103	.641	0	1
BLACK	103	.320	0	1
OTHER	103	.058	0	1
SDEPS	103	.214	0	1
MNONE	103	.117	0	1
MDEPS	103	.184	0	1
RURAL	103	.126	0	1
SOUTH	103	.398	0	1
WEST	103	.252	0	1
NEAST	103	.214	0	1
PARTIC	103	.958	.69	1
INC83	103	9374.796	4300	22000

TABLE XIII

SUMMARY STATISTICS FOR PRODUCTION OCCUPATION/ LESS THAN HIGH SCHOOL DIPLOMA

Variable	N	Mean	Min	Max
AFQT	102	17.784	1	65
CODING	102	40.000	24	56
EDUC	107	9.701	8	11
EXPER	107	5.888	1	11
EXPERSQ	107	39.028	1	121
GENDER	107	.953	0	1
BLACK	107	.131	0	1
OTHER	107	.037	0	1
SDEPS	107	.168	0	1
MNONE	107	.103	0	1
MDEPS	107	.224	0	1
RURAL	107	.150	0	1
SOUTH	107	.467	0	1
WEST	107	.206	0	1
NEAST	107	.187	0	1
PARTIC	107	.941	.69	1
INC83	107	11796.355	4222	37500

TABLE XIV

SUMMARY STATISTICS FOR OPERATOR OCCUPATION/ LESS THAN HIGH SCHOOL DIPLOMA

Variable	N	Mean	Min	Max
AFQT	227	16.705	1	77
CODING	227	39.553	22	67
EDUC	239	9.636	8	11
EXPER	239	6.130	1	11
EXPERSQ	239	43.184	1	121
GENDER	239	.833	0	1
BLACK	239	.180	0	1
OTHER	239	.084	0	1
SDEPS	239	.134	0	1
MNONE	239	.130	0	1
MDEPS	239	.218	0	1
RURAL	238	.223	0	1
SOUTH	239	.498	0	1
WEST	239	.180	0	1
NEAST	239	.130	0	1
PARTIC	239	.942	.69	1
INC83	239	11356.724	4500	30000

TABLE XV

SUMMARY STATISTICS FOR SALES OCCUPATION/HIGH SCHOOL DIPLOMA

Variable	N	Mean	Min	Max
AFQT	173	45.821	4	99
CODING	173	50.578	23	71
EDUC	--	--	--	--
EXPER	181	4.028	0	8
EXPERSQ	181	20.856	0	64
GENDER	181	.425	0	1
BLACK	181	.094	0	1
OTHER	181	.039	0	1
SDEPS	181	.022	0	1
MNONE	181	.199	0	1
MDEPS	181	.177	0	1
RURAL	181	.116	0	1
SOUTH	181	.431	0	1
WEST	181	.260	0	1
NEAST	181	.133	0	1
PARTIC	181	.962	.69	1
INC83	181	11849.663	4325	29997

TABLE XVI

SUMMARY STATISTICS FOR ADMINISTRATIVE OCCUPATION/ HIGH SCHOOL DIPLOMA

Variable	N	Mean	Min	Max
AFQT	503	45.465	1	99
CODING	503	51.423	24	72
EDUC	--	--	--	--
EXPER	529	4.108	0	8
EXPERSQ	529	20.887	0	64
GENDER	529	.210	0	1
BLACK	529	.168	0	1
OTHER	529	.064	0	1
SDEPS	528	.085	0	1
MNONE	528	.186	0	1
MDEPS	528	.174	0	1
RURAL	526	.101	0	1
SOUTH	529	.359	0	1
WEST	529	.174	0	1
NEAST	529	.246	0	1
PARTIC	529	.971	.69	1
INC83	529	11867.533	4500	30000

TABLE XVII

SUMMARY STATISTICS FOR SERVICE OCCUPATION/HIGH SCHOOL DIPLOMA

Variable	N	Mean	Min	Max
AFQT	353	35.377	1	96
CODING	353	46.946	22	69
EDUC	--	--	--	--
EXPER	377	4.156	0	8
EXPERSQ	377	21.844	0	64
GENDER	377	.501	0	1
BLACK	377	.265	0	1
OTHER	377	.029	0	1
SDEPS	377	.127	0	1
MNONE	377	.138	0	1
MDEPS	377	.156	0	1
RURAL	375	.120	0	1
SOUTH	377	.393	0	1
WEST	377	.218	0	1
NEAST	377	.175	0	1
PARTIC	377	.960	.69	1
INC83	377	10928.088	4237	75001

TABLE XVIII

SUMMARY STATISTICS FOR PRODUCTION OCCUPATION/ HIGH SCHOOL DIPLOMA

Variable	N	Mean	Min	Max
AFQT	299	44.321	1	99
CODING	299	47.652	27	70
EDUC	--	--	--	--
EXPER	315	4.498	0	8
EXPERSQ	315	24.365	0	64
GENDER	315	.905	0	1
BLACK	315	.098	0	1
OTHER	315	.044	0	1
SDEPS	315	.105	0	1
MNONE	315	.165	0	1
MDEPS	315	.184	0	1
RURAL	314	.201	0	1
SOUTH	315	.375	0	1
WEST	315	.181	0	1
NEAST	315	.184	0	1
PARTIC	315	.950	.69	1
INC83	315	15986.479	4500	40000

TABLE XIX

SUMMARY STATISTICS FOR OPERATOR OCCUPATION/ HIGH SCHOOL DIPLOMA

Variable	N	Mean	Min	Max
AFQT	556	36.180	1	97
CODING	556	46.379	24	72
EDUC	--	--	--	--
EXPER	582	4.280	0	8
EXPERSQ	582	22.586	0	64
GENDER	582	.794	0	1
BLACK	582	.223	0	1
OTHER	582	.048	0	1
SDEPS	582	.107	0	1
MNONE	582	.115	0	1
MDEPS	582	.180	0	1
RURAL	578	.183	0	1
SOUTH	582	.395	0	1
WEST	582	.167	0	1
NEAST	582	.191	0	1
PARTIC	582	.950	.69	1
INC83	582	13314.237	4451	40000

TABLE XX

SUMMARY STATISTICS FOR SALES OCCUPATION/SOME COLLEGE

Variable	N	Mean	Min	Max
AFQT	98	52.092	4	99
CODING	98	50.490	29	68
EDUC	102	13.618	13	15
EXPER	102	3.284	0	7
EXPERSQ	102	14.029	0	49
GENDER	102	.471	0	1
BLACK	102	.118	0	1
OTHER	102	.078	0	1
SDEPS	102	.049	0	1
MNONE	102	.127	0	1
MDEPS	102	.108	0	1
RURAL	100	.060	0	1
SOUTH	102	.353	0	1
WEST	102	.265	0	1
NEAST	102	.216	0	1
PARTIC	102	.974	.69	1
INC83	102	12776.990	5000	35000

TABLE XXI

SUMMARY STATISTICS FOR ADMINISTRATIVE OCCUPATION/SOME COLLEGE

Variable	N	Mean	Min	Max
AFQT	277	50.365	1	99
CODING	277	52.744	25	72
EDUC	282	13.571	13	15
EXPER	282	3.369	0	7
EXPERSQ	282	14.730	0	49
GENDER	282	.191	0	1
BLACK	282	.266	0	1
OTHER	282	.060	0	1
SDEPS	282	.110	0	1
MNONE	282	.167	0	1
MDEPS	282	.103	0	1
RURAL	281	.089	0	1
SOUTH	282	.411	0	1
WEST	282	.227	0	1
NEAST	282	.209	0	1
PARTIC	282	.970	.69	1
INC83	282	13247.472	5000	75001

TABLE XXII

SUMMARY STATISTICS FOR SERVICE OCCUPATION/SOME COLLEGE

Variable	N	Mean	Min	Max
AFQT	141	49.929	1	99
CODING	141	49.135	25	68
EDUC	148	13.662	13	15
EXPER	148	3.128	0	7
EXPERSQ	148	12.993	0	49
GENDER	148	.534	0	1
BLACK	148	.291	0	1
OTHER	148	.034	0	1
SDEPS	148	.074	0	1
MNONE	148	.081	0	1
MDEPS	148	.142	0	1
RURAL	146	.068	0	1
SOUTH	148	.378	0	1
WEST	148	.264	0	1
NEAST	148	.182	0	1
PARTIC	148	.954	.69	1
INC83	148	12020.703	4300	50000

TABLE XXIII

SUMMARY STATISTICS FOR MANAGERIAL OCCUPATION/ FOUR YEAR DEGREE OR MORE

Variable	N	Mean	Min	Max
AFQT	236	76.331	14	99
CODING	236	54.746	28	72
EDUC	241	16.241	16	19
EXPER	241	1.867	0	4
EXPERSQ	241	4.689	0	16
GENDER	241	.427	0	1
BLACK	241	.129	0	1
OTHER	241	.012	0	1
SDEPS	241	.021	0	1
MNONE	241	.241	0	1
MDEPS	241	.041	0	1
RURAL	240	.058	0	1
SOUTH	241	.402	0	1
WEST	241	.129	0	1
NEAST	241	.266	0	1
PARTIC	241	.974	.69	1
INC83	241	18887.515	4700	75001

APPENDIX D

REGRESSION AND BETA COEFFICIENTS

TABLE I

REGRESSION AND BETA COEFFICIENTS

AGGREGATE SAMPLE

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.004	.275	(.00)	--	--	--
CODING	--	--	--	--	--	--	.005	.108	(.23)
INTER1	--	--	--	-.000	-.132	(.23)	-.000	-.001	(.96)
EDUC	.085	.347	(.00)	.071	.290	(.00)	.077	.314	(.00)
EXPER	.080	.395	(.00)	.072	.357	(.00)	.073	.364	(.00)
EXPERSQ	-.004	-.191	(.00)	-.004	-.169	(.00)	-.004	-.168	(.00)
GENDER	.209	.231	(.00)	.201	.223	(.00)	.225	.249	(.00)
BLACK	-.082	-.070	(.00)	-.023	-.020	(.21)	-.052	-.045	(.00)
OTHER	-.047	-.022	(.11)	-.009	-.004	(.77)	-.038	-.018	(.20)
SDEPS	.029	.019	(.18)	.043	.028	(.05)	.036	.024	(.10)
MNONE	.059	.047	(.00)	.054	.043	(.00)	.056	.045	(.00)
MDEPS	.072	.057	(.00)	.071	.056	(.00)	.069	.055	(.00)
RURAL	-.081	-.059	(.00)	-.082	-.060	(.00)	-.082	-.060	(.00)
SOUTH	-.034	-.037	(.04)	-.019	-.020	(.27)	-.026	-.029	(.12)
WEST	.052	.046	(.01)	.054	.047	(.01)	.054	.048	(.01)
NEAST	.030	.027	(.11)	.044	.039	(.02)	.044	.040	(.02)
PARTIC	1.315	.220	(.00)	1.321	.221	(.00)	1.311	.220	(.00)
MANAG	.150	.101	(.00)	.120	.081	(.00)	.135	.092	(.00)
TECH	.219	.097	(.00)	.179	.081	(.00)	.201	.091	(.00)
SALES	-.054	-.034	(.03)	-.080	-.051	(.00)	-.069	-.044	(.01)
ADMIN	.011	.011	(.57)	-.017	-.016	(.40)	-.008	-.007	(.70)
SERV	-.147	-.121	(.00)	-.169	-.139	(.00)	-.165	-.135	(.00)
PROD	.099	.073	(.00)	.089	.067	(.00)	.095	.071	(.00)
N = 4072									
R^2		.309			.326			.319	
Adjusted R^2		.305			.322			.215	

TABLE II

REGRESSION AND BETA COEFFICIENTS

FEMALE

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.002	.145	(.34)	--	--	--
CODING	--	--	--	--	--	--	.007	.148	(.30)
INTER1	--	--	--	.000	.022	(.90)	-.000	-.094	(.65)
EDUC	.074	.335	(.00)	.055	.249	(.00)	.080	.362	(.00)
EXPER	.060	.330	(.00)	.054	.297	(.00)	.053	.294	(.00)
EXPERSQ	-.003	-.128	(.05)	-.003	-.120	(.07)	-.002	-.110	(.10)
GENDER	--	--	--	--	--	--	--	--	--
BLACK	-.070	-.068	(.00)	-.015	-.014	(.55)	-.048	-.047	(.04)
OTHER	-.046	-.025	(.23)	-.001	-.000	(.99)	-.028	-.015	(.47)
SDEPS	-.005	-.004	(.87)	-.000	-.000	(.99)	-.001	-.001	(.98)
MNONE	-.015	-.015	(.51)	-.017	-.017	(.45)	-.013	-.013	(.56)
MDEPS	-.057	-.050	(.02)	-.052	-.046	(.04)	-.050	-.044	(.05)
RURAL	-.124	-.098	(.00)	-.125	-.099	(.00)	-.131	-.104	(.00)
SOUTH	-.023	-.028	(.30)	-.013	-.016	(.57)	-.021	-.026	(.35)
WEST	.069	.068	(.01)	.071	.070	(.01)	.069	.068	(.01)
NEAST	.048	.049	(.06)	.056	.058	(.03)	.058	.059	(.02)
PARTIC	1.126	.210	(.00)	1.109	.207	(.00)	1.110	.207	(.00)
MANAG	.211	.174	(.00)	.166	.138	(.00)	.192	.160	(.00)
TECH	.273	.152	(.00)	.220	.125	(.00)	.252	.143	(.00)
SALES	-.072	-.057	(.04)	-.097	-.078	(.01)	-.086	-.069	(.02)
ADMIN	.049	.061	(.09)	.016	.019	(.60)	.029	.036	(.33)
SERV	-.082	-.079	(.01)	-.104	-.100	(.00)	-.094	-.090	(.00)
PROD	.212	.079	(.00)	.191	.071	(.00)	.215	.080	(.00)
N = 1785									
R^2		.313			.329			.320	
Adjusted R^2		.306			.320			.312	

TABLE III

REGRESSION AND BETA COEFFICIENTS

MALE

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.006	.337	(.01)	--	--	--
CODING	--	--	--	--	--	--	.005	.096	(.41)
INTER1	--	--	--	-.000	-.201	(.16)	.000	.023	(.89)
EDUC	.089	.342	(.00)	.076	.294	(.00)	.074	.285	(.00)
EXPER	.104	.491	(.00)	.096	.456	(.00)	.100	.468	(.00)
EXPERSQ	-.007	-.287	(.00)	-.006	-.263	(.00)	-.006	-.266	(.00)
GENDER	--	--	--	--	--	--	--	--	--
BLACK	-.081	-.066	(.00)	-.017	-.014	(.50)	-.045	-.037	(.08)
OTHER	-.042	-.023	(.22)	-.018	-.008	(.67)	-.048	-.021	(.27)
SDEPS	.053	.031	(.10)	.075	.045	(.02)	.063	.037	(.05)
MNONE	.129	.089	(.00)	.124	.086	(.00)	.124	.086	(.00)
MDEPS	.161	.124	(.00)	.160	.123	(.00)	.155	.118	(.00)
RURAL	-.052	-.026	(.05)	-.053	-.039	(.05)	-.049	-.035	(.07)
SOUTH	-.039	-.040	(.10)	-.022	-.028	(.37)	-.028	-.028	(.26)
WEST	.046	.039	(.09)	.045	.038	(.10)	.049	.041	(.08)
NEAST	.013	.011	(.62)	.029	.024	(.30)	.030	.025	(.29)
PARTIC	1.411	.229	(.00)	1.436	.232	(.00)	1.420	.229	(.00)
MANAG	.127	.075	(.00)	.106	.063	(.01)	.112	.067	(.00)
TECH	.199	.076	(.00)	.175	.067	(.00)	.185	.072	(.00)
SALES	-.002	-.001	(.97)	-.030	-.017	(.42)	-.019	-.011	(.61)
ADMIN	.011	.006	(.75)	-.007	-.004	(.83)	-.004	-.002	(.91)
SERV	-.177	-.137	(.00)	-.204	-.155	(.00)	-.200	-.152	(.00)
PROD	.079	.068	(.00)	.071	.061	(.00)	.073	.063	(.00)
N = 2287									
R^2		.287			.308			.302	
Adjusted R^2		.280			.301			.295	

TABLE IV
REGRESSION AND BETA COEFFICIENTS
FEMALE/LESS THAN HIGH SCHOOL DIPLOMA

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.014	.702	(.45)	--	--	--
CODING	--	--	--	--	--	--	.069	1.886	(.09)
INTER1	--	--	--	-.001	-.566	(.56)	-.007	-2.219	(.10)
EDUC	.100	.297	(.00)	.113	.330	(.04)	.403	1.175	(.04)
EXPER	.042	.300	(.49)	.035	.251	(.57)	.054	.382	(.40)
EXPERSQ	-.002	-.153	(.72)	-.001	-.122	(.78)	-.003	-.232	(.59)
GENDER	--	--	--	--	--	--	--	--	--
BLACK	.043	.037	(.68)	.055	.046	(.65)	.021	.017	(.86)
OTHER	.068	.057	(.53)	.060	.049	(.61)	.082	.068	(.48)
SDEPS	-.141	-.161	(.11)	-.130	-.150	(.16)	-.113	-.130	(.24)
MNONE	-.046	-.054	(.59)	-.049	-.057	(.58)	-.039	-.046	(.67)
MDEPS	-.027	-.033	(.74)	-.062	-.075	(.49)	-.045	-.055	(.62)
RURAL	-.009	-.010	(.91)	-.004	-.004	(.96)	-.027	-.029	(.75)
SOUTH	-.033	-.048	(.71)	-.016	-.024	(.86)	-.022	-.032	(.81)
WEST	.055	.077	(.54)	.062	.086	(.51)	.052	.072	(.58)
NEAST	.108	.121	(.30)	.125	.134	(.26)	.082	.088	(.45)
PARTIC	1.116	.286	(.00)	1.246	.320	(.00)	1.127	.289	(.00)
MANAG	.668	.250	(.00)	.641	.246	(.01)	.662	.254	(.01)
TECH	.139	.073	(.41)	.061	.033	(.74)	.204	.109	(.26)
SALES	-.142	-.138	(.16)	-.148	-.142	(.19)	-.137	-.132	(.22)
ADMIN	-.094	-.109	(.27)	-.096	-.112	(.28)	-.071	-.082	(.44)
SERV	-.220	-.301	(.00)	-.211	-.287	(.01)	-.198	-.269	(.01)
PROD	.086	.050	(.57)	.113	.168	(.46)	.121	.074	(.43)
N = 129									
R^2		.317			.314			.317	
Adjusted R^2		.194			.168			.170	

TABLE V

REGRESSION AND BETA COEFFICIENTS

MALE/LESS THAN HIGH SCHOOL DIPLOMA

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.016	.618	(.25)	--	--	--
CODING	--	--	--	--	--	--	-.001	-.028	(.95)
INTER1	--	--	--	-.001	-.547	(.32)	.000	.066	(.91)
EDUC	.064	.154	(.00)	.068	.165	(.03)	.043	.104	(.67)
EXPER	.062	.332	(.11)	.070	.377	(.08)	.068	.369	(.09)
EXPERSQ	-.003	-.209	(.31)	-.004	-.268	(.20)	-.004	-.252	(.24)
GENDER	--	--	--	--	--	--	--	--	--
BLACK	-.067	-.065	(.21)	-.035	-.034	(.54)	-.059	-.057	(.30)
OTHER	.074	.043	(.38)	.092	.055	(.29)	.067	.040	(.44)
SDEPS	.139	.118	(.02)	.144	.123	(.02)	.142	.122	(.02)
MNONE	.268	.190	(.00)	.270	.189	(.00)	.275	.192	(.00)
MDEPS	.203	.193	(.00)	.189	.179	(.00)	.188	.178	(.00)
RURAL	.017	.015	(.76)	.052	.047	(.35)	.041	.038	(.46)
SOUTH	-.040	-.047	(.49)	-.029	-.035	(.62)	-.030	-.035	(.62)
WEST	.110	.103	(.10)	.135	.126	(.05)	.138	.129	(.05)
NEAST	.039	.035	(.58)	.051	.045	(.49)	.049	.043	(.51)
PARTIC	1.289	.258	(.00)	1.289	.249	(.00)	1.308	.254	(.00)
MANAG	.114	.135	(.45)	.042	.013	(.79)	.100	.032	(.51)
TECH	.263	.062	(.19)	.202	.049	(.32)	.257	.062	(.20)
SALES	.037	.012	(.81)	.016	.005	(.92)	.041	.013	(.79)
ADMIN	-.023	-.011	(.82)	-.027	-.012	(.81)	-.010	-.005	(.93)
SERV	-.133	-.116	(.02)	-.132	-.113	(.03)	-.129	-.110	(.04)
PROD	-.002	-.002	(.97)	-.002	-.002	(.98)	.000	.000	(.99)
N = 430									
R^2		.208			.214			.207	
Adjusted R^2		.169			.168			.160	

TABLE VI

REGRESSION AND BETA COEFFICIENTS

FEMALE/HIGH SCHOOL DIPLOMA

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.002	.142	(.00)	--	--	--
CODING	--	--	--	--	--	--	.004	.094	(.00)
INTER1	--	--	--	--	--	--	--	--	--
EDUC	--	--	--	--	--	--	--	--	--
EXPER	.084	.477	(.00)	.076	.433	(.00)	.075	.425	(.00)
EXPERSQ	-.005	-.218	(.06)	-.004	-.195	(.10)	-.004	-.187	(.11)
GENDER	--	--	--	--	--	--	--	--	--
BLACK	-.070	-.073	(.02)	-.029	-.030	(.38)	-.049	-.052	(.13)
OTHER	-.011	-.007	(.83)	.027	.015	(.62)	-.011	-.006	(.84)
SDEPS	.003	.003	(.93)	.006	.005	(.87)	.011	.009	(.78)
MNONE	-.022	-.024	(.48)	-.025	-.027	(.42)	-.018	-.020	(.55)
MDEPS	-.067	-.072	(.03)	-.061	-.065	(.05)	-.056	-.059	(.08)
RURAL	-.103	-.096	(.00)	-.104	-.098	(.00)	-.107	-.101	(.00)
SOUTH	-.044	-.059	(.13)	-.032	-.043	(.28)	-.042	-.057	(.15)
WEST	.114	.117	(.00)	.108	.112	(.00)	.111	.115	(.00)
NEAST	.062	.067	(.07)	.068	.074	(.05)	.068	.073	(.05)
PARTIC	.863	.179	(.00)	.837	.174	(.00)	.841	.175	(.00)
MANAG	.257	.135	(.00)	.213	.113	(.00)	.248	.131	(.00)
TECH	.308	.138	(.00)	.261	.119	(.00)	.289	.132	(.00)
SALES	-.049	-.042	(.27)	-.077	-.067	(.09)	-.061	-.053	(.17)
ADMIN	.094	.128	(.01)	.053	.073	(.13)	.076	.103	(.03)
SERV	-.044	-.048	(.25)	-.067	-.074	(.08)	-.056	-.062	(.15)
PROD	.248	.119	(.00)	.228	.110	(.00)	.253	.122	(.00)
N = 923									
R^2		.238			.252			.245	
Adjusted R^2		.223			.236			.229	

TABLE VII

REGRESSION AND BETA COEFFICIENTS

MALE/HIGH SCHOOL DIPLOMA

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.003	.181	(.00)	--	--	--
CODING	--	--	--	--	--	--	.007	.129	(.00)
INTER1	--	--	--	--	--	--	--	--	--
EDUC	--	--	--	--	--	--	--	--	--
EXPER	.125	.572	(.00)	.117	.539	(.00)	.121	.559	(.00)
EXPERSQ	-.009	-.339	(.00)	-.008	-.318	(.00)	-.008	-.324	(.00)
GENDER	--	--	--	--	--	--	--	--	--
BLACK	-.113	-.098	(.00)	-.040	-.035	(.25)	-.078	-.069	(.02)
OTHER	-.104	-.048	(.07)	-.071	-.032	(.23)	-.105	-.047	(.08)
SDEPS	.036	.023	(.39)	.057	.036	(.18)	.043	.027	(.31)
MNONE	.099	.072	(.01)	.105	.077	(.01)	.098	.072	(.01)
MDEPS	.149	.123	(.00)	.146	.120	(.00)	.137	.113	(.00)
RURAL	-.067	-.053	(.04)	-.070	-.057	(.04)	-.067	-.054	(.05)
SOUTH	-.062	-.067	(.05)	-.043	-.047	(.18)	-.051	-.054	(.12)
WEST	.009	.008	(.79)	.005	.004	(.90)	.006	.006	(.86)
NEAST	-.019	-.017	(.60)	-.001	-.001	(.97)	-.004	-.003	(.91)
PARTIC	1.251	.216	(.00)	1.279	.222	(.00)	1.251	.217	(.00)
MANAG	.100	.041	(.12)	.037	.015	(.58)	.062	.025	(.35)
TECH	.190	.062	(.02)	.148	.049	(.07)	.171	.057	(.03)
SALES	.011	.006	(.82)	-.025	-.014	(.61)	-.013	-.007	(.80)
ADMIN	-.011	-.007	(.80)	-.033	-.021	(.44)	-.034	-.002	(.43)
SERV	-.178	-.145	(.00)	-.198	-.159	(.00)	-.193	-.155	(.00)
PROD	.104	.100	(.00)	.090	.086	(.00)	.094	.090	(.00)
N = 1247									
R^2		.237			.273			.262	
Adjusted R^2		.225			.260			.250	

TABLE VIII

REGRESSION AND BETA COEFFICIENTS

FEMALE/SOME COLLEGE

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	-.025	-1.679	(.04)	--	--	--
CODING	--	--	--	--	--	--	-.004	-.088	(.92)
INTER1	--	--	--	.002	1.896	(.03)	.000	.156	(.87)
EDUC	.036	.067	(.14)	-.088	-.165	(.11)	.011	.021	(.94)
EXPER	.108	.524	(.00)	.101	.491	(.00)	.106	.514	(.00)
EXPERSQ	-.013	-.427	(.00)	-.013	-.416	(.01)	-.013	-.427	(.00)
GENDER	--	--	--	--	--	--	--	--	--
BLACK	-.064	-.073	(.10)	.002	.002	(.97)	-.045	-.052	(.28)
OTHER	-.141	-.084	(.05)	-.057	-.033	(.44)	-.077	-.044	(.31)
SDEPS	.037	.031	(.48)	.045	.038	(.40)	.040	.034	(.45)
MNONE	.061	.061	(.17)	.055	.055	(.22)	.064	.063	(.16)
MDEPS	-.014	-.011	(.80)	-.007	-.006	(.90)	.004	.003	(.94)
RURAL	-.203	-.140	(.00)	-.215	-.146	(.00)	-.233	-.158	(.00)
SOUTH	-.005	-.006	(.92)	.006	.008	(.90)	.000	.000	(.99)
WEST	.023	.026	(.65)	.029	.032	(.57)	.023	.026	(.65)
NEAST	-.023	-.024	(.66)	-.012	-.013	(.82)	-.006	-.007	(.91)
PARTIC	1.397	.253	(.00)	1.474	.267	(.00)	1.426	.259	(.00)
MANAG	.176	.135	(.06)	.094	.073	(.35)	.144	.111	(.15)
TECH	.068	.047	(.48)	-.009	-.006	(.93)	.038	.026	(.71)
SALES	-.281	-.243	(.00)	-.329	-.286	(.00)	-.311	-.270	(.00)
ADMIN	-.074	-.099	(.35)	-.118	-.157	(.17)	-.099	-.131	(.26)
SERV	-.238	-.227	(.01)	-.301	-.287	(.00)	-.261	-.249	(.01)
PROD	.045	.011	(.80)	-.024	-.006	(.90)	.015	.004	(.94)
N = 451									
R^2		.283			.310			.289	
Adjusted R^2		.250			.275			.252	

TABLE IX

REGRESSION AND BETA COEFFICIENTS

MALE/SOME COLLEGE

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.042	2.329	(.01)	--	--	--
CODING	--	--	--	--	--	--	.173	2.748	(.00)
INTER1	--	--	--	-.003	-2.342	(.01)	-.012	-2.892	(.00)
EDUC	.012	.017	(.73)	.187	.270	(.02)	.629	.909	(.00)
EXPER	.121	.448	(.01)	.146	.536	(.00)	.148	.541	(.00)
EXPERSQ	-.011	-.273	(.10)	-.016	-.386	(.02)	-.016	-.384	(.02)
GENDER	--	--	--	--	--	--	--	--	--
BLACK	-.041	-.033	(.50)	-.017	-.014	(.81)	-.015	-.012	(.81)
OTHER	-.135	-.057	(.23)	-.125	-.054	(.26)	-.103	-.044	(.35)
SDEPS	-.007	-.003	(.95)	-.061	-.025	(.59)	-.082	-.034	(.47)
MNONE	.109	.075	(.13)	.075	.051	(.30)	.074	.051	(.30)
MDEPS	.195	.144	(.00)	.184	.134	(.01)	.195	.142	(.00)
RURAL	-.113	-.070	(.14)	-.152	-.093	(.05)	-.146	-.089	(.06)
SOUTH	.040	.039	(.55)	.058	.058	(.39)	.066	.066	(.32)
WEST	.061	.057	(.38)	.052	.046	(.47)	.064	.058	(.37)
NEAST	.124	.106	(.09)	.136	.118	(.06)	.146	.127	(.05)
PARTIC	1.853	.284	(.00)	1.901	.285	(.00)	1.902	.285	(.00)
MANAG	.117	.073	(.19)	.124	.079	(.17)	.120	.076	(.18)
TECH	.215	.103	(.05)	.239	.114	(.03)	.238	.113	(.03)
SALES	-.047	-.033	(.57)	-.023	-.016	(.79)	-.033	-.023	(.69)
ADMIN	.088	.064	(.26)	.094	.069	(.23)	.094	.069	(.23)
SERV	-.138	-.117	(.06)	-.165	-.139	(.02)	-.174	-.146	(.02)
PROD	.158	.128	(.04)	.179	.146	(.02)	.156	.127	(.04)
N = 384									
R^2		.263			.303			.311	
Adjusted R^2		.224			.260			.268	

TABLE X

REGRESSION AND BETA COEFFICIENTS

FEMALE/FOUR YEAR DEGREE OR HIGHER

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	-.028	-1.454	(.52)	--	--	--
CODING	--	--	--	--	--	--	-.069	-1.431	(.50)
INTER1	--	--	--	.002	1.609	(.48)	.004	1.559	(.48)
EDUC	.096	.121	(.04)	-.059	-.076	(.79)	-.168	-.216	(.66)
EXPER	.080	.234	(.12)	.076	.222	(.14)	.074	.217	(.15)
EXPERSQ	-.024	-.232	(.12)	-.023	-.225	(.13)	-.023	-.225	(.13)
GENDER	--	--	--	--	--	--	--	--	--
BLACK	-.128	-.110	(.06)	-.055	-.048	(.46)	-.106	-.092	(.13)
OTHER	-.085	-.029	(.60)	-.070	-.024	(.66)	-.092	-.032	(.56)
SDEPS	-.074	-.032	(.57)	-.045	-.020	(.73)	-.076	-.033	(.56)
MNONE	-.042	-.043	(.46)	-.043	-.044	(.46)	-.044	-.045	(.45)
MDEPS	-.210	-.101	(.08)	-.274	-.128	(.03)	-.274	-.128	(.03)
RURAL	-.091	-.062	(.28)	-.064	-.045	(.44)	-.070	-.049	(.40)
SOUTH	.035	.044	(.57)	.034	.044	(.58)	.023	.029	(.71)
WEST	.001	.001	(.99)	-.006	-.005	(.94)	-.011	-.009	(.89)
NEAST	.088	.106	(.17)	.103	.125	(.11)	.104	.127	(.10)
PARTIC	1.767	.310	(.00)	1.648	.291	(.00)	1.705	.301	(.00)
MANAG	.217	.281	(.39)	.191	.251	(.44)	.192	.251	(.44)
TECH	.403	.324	(.12)	.386	.316	(.13)	.385	.315	(.13)
SALES	.128	.100	(.62)	.112	.086	(.66)	.107	.082	(.68)
ADMIN	.046	.050	(.86)	.030	.033	(.90)	.028	.031	(.91)
SERV	.065	.040	(.80)	.053	.034	(.84)	.048	.030	(.85)
PROD	.066	.010	(.88)	.087	.014	(.84)	.059	.009	(.89)
N = 282									
R^2		.243			.259			.249	
Adjusted R^2		.187			.197			.187	

TABLE XI

REGRESSION AND BETA COEFFICIENTS
MALE/FOUR YEAR DEGREE OR HIGHER

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	-.119	-4.938	(.28)	--	--	--
CODING	--	--	--	--	--	--	-.046	-.826	(.73)
INTER1	--	--	--	.008	5.370	(.25)	.003	1.033	(.67)
EDUC	-.030	-.032	(.64)	-.721	-.739	(.24)	-.205	-.210	(.66)
EXPER	.227	.559	(.00)	.247	.608	(.00)	.228	.561	(.00)
EXPERSQ	-.047	-.422	(.02)	-.052	-.476	(.01)	-.050	-.456	(.01)
GENDER	--	--	--	--	--	--	--	--	--
BLACK	.060	.023	(.50)	.192	.140	(.05)	.125	.091	(.18)
OTHER	.149	.030	(.64)	.232	.058	(.36)	.120	.025	(.70)
SDEPS	-.023	-.009	(.89)	.173	.061	(.35)	.167	.059	(.37)
MNONE	.043	.033	(.62)	.043	.034	(.60)	.046	.036	(.59)
MDEPS	.098	.052	(.42)	.180	.095	(.14)	.138	.073	(.26)
RURAL	-.054	-.025	(.70)	-.065	-.031	(.63)	-.058	-.028	(.67)
SOUTH	.045	.045	(.57)	.036	.037	(.64)	.044	.045	(.57)
WEST	.206	.153	(.03)	.182	.137	(.06)	.236	.177	(.02)
NEAST	-.014	-.013	(.87)	-.042	-.039	(.61)	-.015	-.014	(.86)
PARTIC	2.104	.267	(.00)	2.105	.270	(.00)	2.045	.262	(.00)
MANAG	.070	.074	(.61)	-.077	-.083	(.59)	.007	.007	(.96)
TECH	.153	.098	(.34)	-.071	-.047	(.67)	.039	.026	(.81)
SALES	.009	.006	(.96)	-.156	-.114	(.32)	-.051	-.038	(.74)
ADMIN	-.045	-.029	(.77)	-.178	-.118	(.26)	-.119	-.079	(.44)
SERV	-.338	-.179	(.06)	-.456	-.249	(.01)	-.388	-.212	(.03)
PROD	-.185	-.095	(.29)	-.277	-.146	(.11)	-.180	-.095	(.30)
N = 226									
R^2		.264			.303			.287	
Adjusted R^2		.194			.227			.209	

TABLE XII
REGRESSION AND BETA COEFFICIENTS
SERVICE OCCUPATION/LESS THAN HIGH SCHOOL DIPLOMA

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.041	1.904	(.11)	--	--	--
CODING	--	--	--	--	--	--	.097	2.190	(.05)
INTER1	--	--	--	-.004	-1.975	(.10)	-.009	-2.526	(.05)
EDUC	.032	.080	(.42)	.104	.262	(.09)	.412	1.037	(.04)
EXPER	.204	1.288	(.00)	.247	1.570	(.00)	.225	1.429	(.00)
EXPERSQ	-.017	-1.209	(.00)	-.021	-1.507	(.00)	-.018	-1.312	(.00)
GENDER	.268	.364	(.00)	.287	.386	(.00)	.306	.412	(.00)
BLACK	-.120	-.158	(.11)	-.162	-.212	(.07)	-.133	-.174	(.10)
OTHER	.227	.150	(.12)	.197	.134	(.19)	.160	.109	(.29)
SDEPS	-.113	-.131	(.19)	-.075	-.088	(.42)	-.046	-.054	(.62)
MNONE	.064	.058	(.54)	.080	.069	(.52)	.100	.086	(.41)
MDEPS	.258	.283	(.00)	.250	.255	(.01)	.251	.256	(.01)
RURAL	.031	.029	(.74)	.054	.050	(.60)	.088	.082	(.40)
SOUTH	-.199	-.275	(.05)	-.182	-.249	(.10)	-.196	-.267	(.08)
WEST	-.083	-.102	(.42)	-.083	-.100	(.48)	-.088	-.105	(.45)
NEAST	-.105	-.122	(.34)	-.109	-.126	(.37)	-.130	-.150	(.30)
PARTIC	1.222	.276	(.00)	1.160	.239	(.02)	1.143	.236	(.02)
N = 103									
R^2		.383			.401			.409	
Adjusted R^2		.285			.276			.287	

TABLE XIII

REGRESSION AND BETA COEFFICIENTS

PRODUCTION OCCUPATION/LESS THAN HIGH SCHOOL DIPLOMA

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.003	.106	(.93)	--	--	--
CODING	--	--	--	--	--	--	-.088	-1.582	(.22)
INTER1	--	--	--	.000	.039	(.97)	.009	1.802	(.21)
EDUC	.075	.170	(.16)	.049	.106	(.55)	-.278	-.604	(.33)
EXPER	.016	.080	(.87)	.006	.031	(.95)	.023	.111	(.82)
EXPERSQ	-.001	-.074	(.87)	-.001	-.056	(.91)	-.002	-.110	(.82)
GENDER	.084	.042	(.68)	.091	.046	(.66)	.077	.038	(.71)
BLACK	-.015	-.012	(.92)	.060	.045	(.71)	-.016	-.012	(.92)
OTHER	.222	.099	(.33)	.261	.117	(.28)	.218	.098	(.36)
SDEPS	.040	.035	(.75)	.041	.035	(.75)	.035	.030	(.79)
MNONE	.246	.176	(.11)	.239	.171	(.13)	.237	.198	(.14)
MDEPS	.197	.193	(.09)	.200	.193	(.10)	.191	.185	(.12)
RURAL	-.011	-.010	(.93)	.040	.032	(.77)	-.006	-.005	(.96)
SOUTH	.022	.026	(.88)	.032	.037	(.83)	.032	.037	(.82)
WEST	.186	.177	(.23)	.197	.188	(.22)	.186	.177	(.24)
NEAST	.056	.051	(.74)	.075	.065	(.67)	.058	.050	(.75)
PARTIC	1.211	.234	(.01)	1.200	.259	(.02)	1.245	.269	(.02)
N = 107									
R^2		.175			.187			.187	
Adjusted R^2		.050			.034			.033	

TABLE XIV
REGRESSION AND BETA COEFFICIENTS
OPERATOR OCCUPATION/LESS THAN HIGH SCHOOL DIPLOMA

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.010	.397	(.53)	--	--	--
CODING	--	--	--	--	--	--	-.015	-.334	(.58)
INTER1	--	--	--	-.001	-.308	(.64)	.002	.471	(.51)
EDUC	.061	.057	(.02)	.057	.147	(.12)	-.023	-.059	(.84)
EXPER	.055	.314	(.27)	.060	.346	(.24)	.054	.313	(.29)
EXPERSQ	-.002	-.154	(.59)	-.003	-.196	(.50)	-.002	-.163	(.58)
GENDER	.192	.175	(.01)	.214	.196	(.00)	.207	.190	(.00)
BLACK	-.032	-.030	(.65)	.002	.002	(.98)	-.007	-.007	(.92)
OTHER	-.004	-.003	(.97)	-.001	-.000	(.99)	-.015	-.010	(.88)
SDEPS	.190	.157	(.02)	.177	.151	(.02)	.175	.150	(.03)
MNONE	.205	.168	(.01)	.193	.158	(.03)	.192	.157	(.03)
MDEPS	.168	.168	(.02)	.141	.144	(.05)	.140	.143	(.05)
RURAL	.032	.033	(.61)	.047	.048	(.47)	.046	.047	(.48)
SOUTH	-.073	-.089	(.29)	-.067	-.083	(.33)	-.071	-.087	(.31)
WEST	.140	.131	(.09)	.165	.154	(.05)	.158	.148	(.06)
NEAST	.105	.085	(.25)	.107	.085	(.27)	.092	.073	(.33)
PARTIC	1.266	.258	(.00)	1.310	.266	(.00)	1.312	.266	(.00)
N = 239									
R^2		.229			.239			.236	
Adjusted R^2		.180			.181			.177	

TABLE XV

REGRESSION AND BETA COEFFICIENTS

SALES OCCUPATION/HIGH SCHOOL DIPLOMA

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.004	.186	(.01)	--	--	--
CODING	--	--	--	--	--	--	.007	.149	(.03)
INTER1	--	--	--	--	--	--	--	--	--
EDUC	--	--	--	--	--	--	--	--	--
EXPER	.156	.778	(.00)	.159	.796	(.00)	.154	.773	(.00)
EXPERSQ	-.013	-.523	(.03)	-.014	-.555	(.02)	-.014	-.545	(.02)
GENDER	.336	.386	(.00)	.319	.365	(.00)	.364	.416	(.00)
BLACK	-.311	-.211	(.00)	-.252	-.174	(.01)	-.249	-.171	(.01)
OTHER	.106	.047	(.43)	.097	.041	(.49)	.074	.031	(.61)
SDEPS	.159	.054	(.39)	.133	.046	(.47)	.118	.041	(.52)
MNONE	-.006	-.006	(.93)	.001	.001	(.99)	.003	.003	(.97)
MDEPS	.039	.035	(.58)	.036	.033	(.61)	.032	.029	(.65)
RURAL	-.112	-.083	(.18)	-.131	-.099	(.11)	-.130	-.098	(.11)
SOUTH	-.035	-.040	(.64)	.023	.027	(.76)	.010	.011	(.90)
WEST	.083	.035	(.29)	.113	.115	(.16)	.127	.129	(.12)
NEAST	.170	.134	(.07)	.244	.195	(.01)	.236	.188	(.02)
PARTIC	1.368	.234	(.00)	1.359	.235	(.00)	1.435	.248	(.00)
N = 181									
R^2		.432			.468			.459	
Adjusted R^2		.387			.421			.411	

TABLE XVI

REGRESSION AND BETA COEFFICIENTS

ADMINISTRATIVE OCCUPATION/HIGH SCHOOL DIPLOMA

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.002	.160	(.00)	--	--	--
CODING	--	--	--	--	--	--	.005	.125	(.00)
INTER1	--	--	--	--	--	--	--	--	--
EDUC	--	--	--	--	--	--	--	--	--
EXPER	.059	.366	(.03)	.056	.342	(.04)	.056	.346	(.04)
EXPERSQ	-.002	-.090	(.58)	-.002	-.098	(.55)	-.002	-.111	(.50)
GENDER	.181	.228	(.00)	.188	.237	(.00)	.202	.254	(.00)
BLACK	-.028	-.032	(.46)	.012	.034	(.77)	-.008	-.009	(.84)
OTHER	.075	.055	(.18)	.108	.078	(.07)	.059	.043	(.31)
SDEPS	.032	.027	(.53)	.056	.049	(.26)	.054	.047	(.28)
MNONE	-.033	-.039	(.38)	-.025	-.029	(.52)	-.021	-.025	(.59)
MDEPS	-.046	-.054	(.23)	-.038	-.044	(.34)	-.026	-.031	(.51)
RURAL	-.084	-.078	(.06)	-.091	-.084	(.04)	-.090	-.083	(.05)
SOUTH	-.076	-.112	(.03)	-.068	-.101	(.06)	-.076	-.112	(.04)
WEST	-.015	-.017	(.73)	-.013	-.015	(.76)	-.007	-.008	(.87)
NEAST	-.031	-.041	(.43)	-.012	-.016	(.76)	-.009	-.012	(.82)
PARTIC	.980	.203	(.00)	1.008	.211	(.00)	.981	.125	(.00)
N = 529									
R^2		.198			.224			.217	
Adjusted R^2		.178			.201			.195	

TABLE XVII

REGRESSION AND BETA COEFFICIENTS

SERVICE OCCUPATION/HIGH SCHOOL DIPLOMA

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.003	.197	(.00)	--	--	--
CODING	--	--	--	--	--	--	.006	.136	(.01)
INTER1	--	--	--	--	--	--	--	--	--
EDUC	--	--	--	--	--	--	--	--	--
EXPER	.055	.314	(.27)	.079	.430	(.03)	.076	.413	(.04)
EXPERSQ	-.002	-.154	(.59)	-.004	-.201	(.29)	-.004	-.182	(.35)
GENDER	.192	.175	(.01)	.131	.165	(.00)	.165	.208	(.00)
BLACK	-.032	-.030	(.65)	-.107	-.121	(.03)	-.136	-.153	(.01)
OTHER	-.004	-.003	(.97)	-.268	-.117	(.02)	-.344	-.151	(.00)
SDEPS	.190	.157	(.02)	-.017	-.015	(.77)	-.021	-.018	(.73)
MNONE	.205	.168	(.01)	.045	.039	(.47)	.048	.041	(.45)
MDEPS	.168	.168	(.02)	.018	.016	(.76)	.011	.010	(.85)
RURAL	.032	.033	(.61)	-.086	-.069	(.16)	-.088	-.071	(.16)
SOUTH	-.073	-.089	(.29)	.056	.069	(.29)	.038	.046	(.48)
WEST	.140	.131	(.09)	.102	.105	(.09)	.105	.107	(.08)
NEAST	.105	.085	(.25)	.082	.079	(.19)	.070	.068	(.26)
PARTIC	1.266	.258	(.00)	1.138	.217	(.00)	1.132	.215	(.00)
N = 239									
R^2		.229			.240			.224	
Adjusted R^2		.180			.208			.191	

TABLE XVIII

REGRESSION AND BETA COEFFICIENTS

PRODUCTION OCCUPATION/HIGH SCHOOL DIPLOMA

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.002	.123	(.03)	--	--	--
CODING	--	--	--	--	--	--	.005	.078	(.16)
INTER1	--	--	--	--	--	--	--	--	--
EDUC	--	--	--	--	--	--	--	--	--
EXPER	.157	.685	(.00)	.153	.658	(.00)	.159	.685	(.00)
EXPERSQ	-.012	-.446	(.02)	-.012	-.453	(.03)	-.012	-.456	(.03)
GENDER	.164	.101	(.04)	.172	.106	(.04)	.186	.115	(.03)
BLACK	-.173	-.110	(.03)	-.111	-.071	(.21)	-.152	-.098	(.08)
OTHER	-.114	-.050	(.32)	-.121	-.050	(.34)	-.148	-.061	(.24)
SDEPS	.075	.049	(.35)	.107	.068	(.20)	.096	.061	(.25)
MNONE	.178	.142	(.01)	.181	.141	(.01)	.174	.136	(.02)
MDEPS	.132	.110	(.05)	.151	.123	(.03)	.135	.110	(.05)
RURAL	-.069	-.049	(.26)	-.067	-.062	(.28)	-.075	-.065	(.23)
SOUTH	.039	.040	(.53)	.037	.038	(.56)	.047	.048	(.47)
WEST	.137	.113	(.06)	.129	.104	(.08)	.136	.110	(.07)
NEAST	.231	.192	(.00)	.240	.192	(.00)	.251	.201	(.00)
PARTIC	1.564	.272	(.00)	1.600	.279	(.00)	1.595	.278	(.00)
N = 315									
R^2		.279			.295			.288	
Adjusted R^2		.247			.260			.253	

TABLE XIX

REGRESSION AND BETA COEFFICIENTS

OPERATOR OCCUPATION/HIGH SCHOOL DIPLOMA

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.003	.166	(.00)	--	--	--
CODING	--	--	--	--	--	--	.008	.149	(.00)
INTER1	--	--	--	--	--	--	--	--	--
EDUC	--	--	--	--	--	--	--	--	--
EXPER	.115	.031	(.00)	.102	.467	(.00)	.108	.492	(.00)
EXPERSQ	-.009	-.304	(.03)	-.007	-.248	(.09)	-.007	-.260	(.07)
GENDER	.306	.273	(.00)	.287	.256	(.00)	.344	.307	(.00)
BLACK	-.045	-.042	(.32)	.033	.031	(.50)	.005	.005	(.91)
OTHER	-.048	-.023	(.56)	-.010	-.004	(.91)	-.020	-.009	(.82)
SDEPS	.016	.011	(.79)	.018	.012	(.76)	.016	.011	(.79)
MNONE	.048	.034	(.40)	.063	.045	(.27)	.051	.036	(.37)
MDEPS	.107	.091	(.03)	.113	.095	(.02)	.107	.090	(.03)
RURAL	-.056	-.048	(.21)	-.068	-.059	(.13)	-.063	-.055	(.16)
SOUTH	-.128	-.140	(.01)	-.107	-.115	(.02)	-.123	-.132	(.01)
WEST	-.028	-.024	(.60)	-.011	-.009	(.85)	-.016	-.013	(.78)
NEAST	-.100	-.084	(.07)	-.091	-.079	(.09)	-.099	-.085	(.06)
PARTIC	.979	.175	(.00)	.963	.170	(.00)	.914	.161	(.00)
N = 582									
R^2		.218			.241			.239	
Adjusted R^2		.200			.221			.219	

TABLE XX

REGRESSION AND BETA COEFFICIENTS

SALES OCCUPATION/SOME COLLEGE

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	-.023	-1.273	(.48)	--	--	--
CODING	--	--	--	--	--	--	-.018	-.332	(.86)
INTER1	--	--	--	.002	1.500	(.42)	.002	.007	(.79)
EDUC	.026	.039	(.69)	-.109	-.163	(.46)	-.076	-.113	(.83)
EXPER	.052	.205	(.52)	.076	.297	(.36)	.052	.203	(.53)
EXPERSQ	-.006	-.181	(.57)	-.010	-.270	(.41)	-.007	-.177	(.59)
GENDER	.312	.339	(.00)	.289	.309	(.00)	.320	.343	(.00)
BLACK	-.422	-.288	(.00)	-.346	-.228	(.03)	-.371	-.244	(.02)
OTHER	-.439	-.259	(.01)	-.383	-.228	(.02)	-.389	-.231	(.02)
SDEPS	-.075	-.032	(.72)	-.021	-.009	(.92)	-.044	-.019	(.84)
MNONE	.158	.115	(.22)	.142	.105	(.27)	.150	.111	(.25)
MDEPS	.032	.021	(.82)	-.012	-.008	(.94)	-.004	-.002	(.98)
RURAL	-.147	-.176	(.40)	-.175	-.091	(.32)	-.172	-.090	(.34)
SOUTH	-.011	-.012	(.93)	-.007	-.007	(.96)	-.000	-.000	(.99)
WEST	-.124	-.120	(.33)	-.135	-.126	(.30)	-.126	-.118	(.34)
NEAST	.080	.073	(.54)	.090	.081	(.51)	.100	.091	(.47)
PARTIC	1.677	.235	(.01)	1.857	.249	(.01)	1.519	.204	(.05)
N = 102									
R^2		.384			.414			.402	
Adjusted R^2		.283			.295			.281	

TABLE XXI

REGRESSION AND BETA COEFFICIENTS
ADMINISTRATIVE OCCUPATION/SOME COLLEGE

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.013	.866	(.47)	--	--	--
CODING	--	--	--	--	--	--	.062	1.427	(.25)
INTER1	--	--	--	-.001	-.815	(.50)	-.004	-1.467	(.26)
EDUC	.029	.052	(.37)	.075	.133	(.34)	.266	.471	(.21)
EXPER	.114	.572	(.00)	.115	.579	(.00)	.118	.598	(.00)
EXPERSQ	-.013	-.441	(.02)	-.013	-.449	(.02)	-.014	-.466	(.02)
GENDER	.245	.262	(.00)	.233	.249	(.00)	.246	.263	(.00)
BLACK	.045	.054	(.34)	.078	.094	(.14)	.065	.079	(.19)
OTHER	-.102	-.067	(.24)	-.043	-.028	(.63)	-.057	-.037	(.52)
SDEPS	.007	.006	(.92)	.006	.005	(.93)	.006	.005	(.93)
MNONE	.007	.008	(.90)	.001	.001	(.99)	.003	.003	(.95)
MDEPS	.020	.016	(.78)	.039	.032	(.59)	.043	.035	(.55)
RURAL	-.190	-.147	(.01)	-.207	-.163	(.01)	-.207	-.162	(.01)
SOUTH	-.081	-.109	(.18)	-.069	-.093	(.26)	-.077	-.104	(.20)
WEST	-.021	-.024	(.76)	-.015	-.017	(.82)	-.024	-.028	(.71)
NEAST	-.045	-.050	(.51)	-.027	-.030	(.70)	-.028	-.031	(.68)
PARTIC	1.619	.292	(.00)	1.615	.287	(.00)	1.619	.288	(.00)
N = 282									
R^2		.231			.243			.244	
Adjusted R^2		.190			.196			.197	

TABLE XXII

REGRESSION AND BETA COEFFICIENTS

SERVICE OCCUPATION/SOME COLLEGE

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	.034	2.183	(.21)	--	--	--
CODING	--	--	--	--	--	--	.208	4.259	(.02)
INTER1	--	--	--	-.002	-2.147	(.24)	-.015	-4.677	(.02)
EDUC	.022	.035	(.66)	.145	.241	(.25)	.837	1.390	(.01)
EXPER	.012	.049	(.85)	.061	.252	(.37)	.056	.230	(.40)
EXPERSQ	.001	.023	(.93)	-.007	-.190	(.49)	-.005	-.138	(.62)
GENDER	.170	.188	(.02)	.121	.141	(.10)	.101	.117	(.17)
BLACK	-.096	-.096	(.27)	-.043	-.046	(.68)	-.100	-.106	(.30)
OTHER	.179	.072	(.38)	.165	.072	(.41)	.199	.087	(.30)
SDEPS	.250	.146	(.07)	.196	.118	(.17)	.153	.092	(.27)
MNONE	.371	.226	(.01)	.288	.181	(.04)	.286	.180	(.04)
MDEPS	.255	.198	(.02)	.242	.199	(.03)	.208	.170	(.06)
RURAL	-.020	-.011	(.89)	-.098	-.053	(.52)	-.088	-.048	(.56)
SOUTH	.026	.028	(.81)	.041	.047	(.69)	.061	.069	(.55)
WEST	.039	.038	(.72)	.000	.000	(.99)	.014	.015	(.90)
NEAST	.015	.013	(.90)	.053	.049	(.66)	.077	.071	(.51)
PARTIC	1.427	.261	(.00)	1.715	.333	(.00)	1.870	.363	(.00)
N = 148									
R^2		.241			.240			.261	
Adjusted R^2		.160			.140			.164	

TABLE XXIII

REGRESSION AND BETA COEFFICIENTS

MANAGERIAL OCCUPATION/FOUR YEAR DEGREE OR HIGHER

	No Ability			AFQT Model			CODING Model		
Variable	b	beta	(sig)	b	beta	(sig)	b	beta	(sig)
AFQT	--	--	--	-.010	-.443	(.85)	--	--	--
CODING	--	--	--	--	--	--	-.118	-2.044	(.24)
INTER1	--	--	--	.001	.719	(.76)	.008	2.374	(.20)
EDUC	.055	.076	(.25)	-.033	-.284	(.91)	-.399	-.528	(.27)
EXPER	.100	.248	(.16)	.092	.226	(.21)	.086	.211	(.24)
EXPERSQ	-.024	-.207	(.23)	-.024	-.207	(.24)	-.023	-.202	(.25)
GENDER	.239	.267	(.00)	.222	.249	(.00)	.272	.305	(.00)
BLACK	.038	.028	(.64)	.153	.118	(.07)	.116	.189	(.17)
OTHER	-.092	-.023	(.70)	-.021	-.005	(.93)	-.081	-.021	(.73)
SDEPS	-.428	-.138	(.03)	-.192	-.056	(.36)	-.290	-.085	(.17)
MNONE	-.015	-.014	(.82)	-.009	-.009	(.89)	.002	.002	(.98)
MDEPS	-.060	-.026	(.68)	-.042	-.017	(.78)	-.101	-.041	(.51)
RURAL	-.158	-.083	(.18)	-.140	-.075	(.23)	-.134	-.072	(.26)
SOUTH	.052	.057	(.49)	.066	.073	(.37)	.052	.058	(.48)
WEST	.130	.098	(.17)	.127	.096	(.18)	.152	.115	(.11)
NEAST	.070	.069	(.39)	.077	.077	(.34)	.090	.091	(.26)
PARTIC	1.542	.231	(.00)	1.475	.224	(.00)	1.503	.229	(.00)
N = 241									
R^2		.194			.241			.219	
Adjusted R^2		.144			.186			.162	

LIST OF REFERENCES

Ashenfelter, Orley and Mooney, Joseph D. "Graduate Education, Ability, and Earnings." The Review of Economics and Statistics 50 (February 1968): 78-86.

Behrman, Jere R. and Birdsall, Nancy. "The Quality of Schooling: Quantity Alone is Misleading." The American Economic Review 73 (December 1985): 928-946.

Blackaby, David H. "An Analysis of the Male Racial Earnings Differential in the UK, Using the General Household Survey." Applied Economics 18 (1986): 1233-1242.

Boissiere, M.; Knight, J.B.; and R.H. Sabot. "Earnings, Schooling, Ability, and Cognitive Skills." American Economic Review 75(5) (December 1985): 1016-1030.

Department of Defense. Profile of American Youth: 1980 Nationwide Administration of the Armed Services Vocational Aptitude Battery. Washington, D.C.: Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics), March 1982.

Griliches, Zvi. "Estimating the Returns to Schooling: Some Econometric Problems." Econometrica 45 (January 1977): 1-22.

Griliches, Zvi and Mason, William M. "Education, Income, and Ability." Journal of Political Economy 80, (May/June 1972): 74-103.

Halvorsen, Robert and Palmquist, Raymond. "The Interpretation of Dummy Variables in Semilogarithmic Equations." American Economic Review 70(3) (June 1980): 474-475.

Hartog, Joop. "Earnings Functions: Beyond Human Capital." Applied Economics 18 (1986): 1291-1309.

Hause, John C. "Earnings Profile: Ability and Schooling." Journal of Political Economy 80 (May/June 1972): 108-138.

Heckman, James J. and Hotz, Joseph V. "An Investigation of the Labor Market Earnings of Panamanian Males." The Journal of Human Resources 21 (May 1986): 507-542.

Johnson, Thomas V. "A Description of "Profile of American Youth" Data for Military Manpower and Personnel Analysis." Masters Thesis, Naval Postgraduate School, Monterey, CA, December 1986.

Kaufman, Bruce E. The Economics of Labor Markets and Labor Relations. New York: CBS College Publishing, 1986.

Knowles, Edwin J., Jr. "Income, Education and Ability: The Utility of Alternative Measures of Ability." Masters Thesis, Naval Postgraduate School, Monterey, CA, December 1986.

Mincer, Jacob. Schooling, Experience, and Earnings. Washington, D.C.: National Bureau of Economic Research, 1974.

Nakosteen, Robert A. and Zimmer, Michael A. "Marital Status and Earnings of Young Men: A Model with Endogenous Selection." The Journal of Human Resources 21 (October 1986): 248-268.

The National Longitudinal Surveys Handbook 1983-1984, Center for Human Resource Research, Ohio State University, Columbus, OH, 1983.

Neter, John; Wasserman, William; and Kutner, Michael. *Applied Linear Statistical Methods*. New York: Richard D. Irwin, Inc., 1985.

Pindyck, Robert S. and Rubinfeld, Daniel L. *Econometric Models and Economic Forecasts*. New York: McGraw-Hill, 1981.

Steinberg, E. P. *Practice for the Armed Forces Test*. New York: Arco Publishing, 1982.

Taubman, Paul J. and Wales, Terence J. "Higher Education, Mental Ability, and Screening." *Journal of Political Economy* 81 (January/February 1973): 28-55.

Taubman, Paul and Wales, Terence. *Higher Education and Earnings: College as an Investment and a Screening Device*. New York: McGraw-Hill, 1974.

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